AMERICAN
JOURNAL OF SURGERY

Vol. XX OCTOBER, 1906 No. 10

SUBCUTANEOUS RUPTURE OF ABDOMINAL VISCERA, WITH ESPECIAL REFERENCE TO THE INTESTINE AND KIDNEY.*

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The treatment of subcutaneous rupture of the individual abdominal viscera is conducted by surgeons in general in accordance with self-defined principles and without material variation. In the rupture of the solid viscera, hemostasis is most essential and in those cases in which the loss of blood is so extensive as to threaten life, it must be secured by ligation, pressure, or, if necessary, in the case of the kidney and spleen, by the removal of the organ itself. On the other hand, in rupture of the hollow viscera, the opening must be closed by suture and the contents that have already escaped into the peritoneal cavity must be carefully removed by sponging and irrigation before the abdominal wall can be closed. In the former group, hemorrhage alone determines a fatal issue; in the latter a spreading peritonitis may already be well under way before appropriate treatment is rendered. In either event the advantage of early surgical intervention is apparent—an advantage that is possible only after skilful, rapid and accurate diagnosis.

Unfortunately, the clinical picture of abdominal trauma is subject to great variation and its discussion seems, therefore, to be most appropriate, with the object of facilitating, if possible, early diagnosis, and of determining the relative importance of the symptoms upon which chief reliance is to be placed. This variation, most pronounced when more than one viscus is damaged, occurs not infrequently in cases of rupture of a single viscus. Usually, in rupture of a solid viscus, the symptoms of hemorrhage rapidly develop, while in those cases not immediately fatal the symptoms of a tardy peritonitis occur irregularly, or else are entirely absent. On the other hand, in rupture of a hollow viscus peritonitis is almost inevitable, while hemorrhage is only an occasional feature.

In cases of multiple rupture much confusion is possible because of the coexistence of both classes of symptoms, and here the symptoms of hemorrhage usually dominate the clinical picture, the associated rupture of one or more hollow viscera being discovered only at the time of operation. But even when one viscus only is involved, the diagnosis cannot always be easily made,—because the symptoms are atypical or because the actual condition is masked by the presence of a painful wound or laceration in some distant part of the body or because of the coexistence of unconsciousness. Hence it seems advisable to briefly consider the symptoms that are ordinarily presented in typical cases of rupture of the different viscera and then to describe the more usual variations that may occur.

The different hollow viscera in which subcutaneous rupture may occur include the urinary bladder, the gall-bladder and the entire length of the alimentary canal. Of these, rupture of the gall-bladder is probably the most rare; isolated rupture of the urinary bladder is usually associated with well-defined focal symptoms; while in rupture of the intestine, which is probably the most common, the focal symptoms are frequently so obscure that an early diagnosis is very difficult. The wide scope of the subject permits the consideration here of rupture of but one of the hollow viscera, and that of the small intestine has been selected not only because of its frequency but also because of the difficulty and at the same time the great importance, of its early and prompt diagnosis.

In typical cases of rupture of the intestine, diagnosis is comparatively simple. In these, as well as in the obscure cases, where diagnosis is much more difficult, considerable assistance may be furnished by a careful consideration of the nature and character of the trauma. The rupture is usually caused by a sharp severe blow, directed against a circumscribed segment of the abdominal wall in a line with the vertebral column. Analysis of 50 cases taken

* Read before the Lackawanna County Society, Scranton, Pa., May 29, 1906.

from the recent literature on the subject, affords 14 instances occurring from a kick of a horse, 9 of trauma from the extremity of a rounded pointed body, such as a wagon-shaft, a pole or the end of a ramrod, 7 due to a fall upon a round elongated body, such as a railing or a bar of iron, while among miscellaneous causes may be mentioned the butting of the head (in play), against the abdomen, or striking the head of a passer-by in a fall from a height of fifteen or twenty feet, and four instances of a run-over by a wagon wheel.

Hernia seems to be a most important predisposing cause, for in no less than six instances rupture of the intestine followed a trauma received upon the button of a truss, and in one of the writer's cases rupture followed a trauma received directly upon the contents of the sac of a reducible hernia in which a truss had never been worn.

CASE 41. Man; 56. Buffer accident. Patient was thrown to the ground unconscious. On being brought to the hospital, was conscious but apathetic. Marked evidences of shock and internal hemorrhage. The whole abdomen moderately distended and generally tympanitic. Increased muscular rigidity equally developed on both sides in the lower abdomen. Reducible inguinal hernia on the right side. The left inguinal canal is occupied by a mass, corresponding in shape to a hernia, which remains of the same size irrespective of the position of the patient. It is soft, moderately elastic in consistency and dull on percussion. No impulse on coughing. Overlying skin discolored and pressure detected at times an emphysematous crackle. Patient refused operation and died in 15 hours after the accident. Autopsy revealed a rupture of the ileum lying near the internal ring. In the left hernial sac, the ruptured sigmoid still was present.

These herniæ were all of the inguinal variety, and the rupture is probably to be explained by the catching of the intestine between the trauma and the ileopectineal line. It is also important to note that in two cases rupture followed a trauma received on the posterior abdominal wall or back; in one, the trauma consisted of a blow from a piece of lumber and in the other of a blow from the pole of a wagon.

Only one instance of a rupture from indirect violence could be found. This was of the ileum and occurred in a man from lifting a twenty-four-foot plank. That the abdominal trauma is not always noticed is well demonstrated in the case of the patient who walked without discomfort a distance of two miles to be treated for contusion of the eye and elbow (Case 3). That the kick of a horse on the abdomen is not always followed by rupture of one of the abdominal viscera is well demonstrated by the statement of Peck, in Luneville (quoted by Von Angerer), who collected a series of 67 cases of this accident in which 65 promptly recovered without serious symptoms and without operative interference.

The clinical features of rupture of the intestine, when typically developed, are well illustrated in the following case of the writer's:

CASE 1. P. N., aet 9; October 24, 1901. This afternoon at about two, the patient was knocked down by a cable car. He did not become unconscious, but complained of pain in the right wrist and hand, the head and the left side of the abdomen. There was pallor and profuse perspiration and the patient was brought to the hospital in considerable shock. One hour after admission, and several times in the next two hours, he vomited green fluid. During this time there were several attacks of colicky pain in the abdomen and the condition of shock continued. On examination, the upper two-thirds of the left side of the abdomen was tender and rigid. There was a point of maximum tenderness three inches to the left of the umbilicus. No mass could be detected. The patient lay on the left side and could not move toward the right without great pain. There was some dulness in the right flank. The left thigh was flexed. The pulse was slightly above 130, the rectal temperature was about 100° F. Six hours after the accident the abdominal tenderness had become more marked and the rigidity had extended over a greater segment of the abdominal wall. There was no improvement in the shock.

Operation, eight hours after the accident, showed a rupture of the ileum, with extensive extravasation of the intestinal contents throughout the left side of the abdomen and pelvis. The patient recovered after suture of the rent and the cleansing of the peritoneal cavity, the abdominal incision being closed with drainage.

In this and other "typical" cases the most significant symptoms include:

(a). The paroxysmal pain and the repeated and persistant vomiting. In ordinary contusion of the abdominal wall these symptoms, when present, appear almost immediately after the trauma has been received and disappear or are much abated one hour afterward.

(b). The refusal of the bowels to respond properly to enemata, only scanty movements resulting, with or without the passage of small amounts of flatus. The injection of the fluid into the bowel may be very painful. In contusion of the abdominal wall, the function of the bowel is not usually disturbed.

(c). A pulse from 90 to 110 at the beginning, which increases in frequency with each successive hour, is one of the most important symptoms. Unfortunately, with the subsidence of the shock a temporary decrease in frequency, although usually not to normal, may take place—an illusory improvement that should never lead to postponement of operation.

(d). After the first hour or two a primary decrease in both the surface and internal temperatures is usually followed by an increase to 100° or 101°, or higher.

On physical examination:

(a). The posture of the patient, usually dorsal, with the thighs flexed, is such as to mitigate the pain. Occasionally, the patient may lie with the body partially inclined toward the affected side. In any event, any change in position intensifies the pain and may even be impossible.

(b). There is absence of diaphragmatic respiration. The abdominal wall is held motionless and any movement intensifies the pain.

(c). Local tenderness with increasing muscular rigidity, which shows a tendency to spread to distant parts of the abdomen, is probably the most reliable of all symptoms gained by the physical examination of the patient. In contusion of the abdominal wall only, these symptoms are sharply circumscribed and disappear quickly. The rigidity need not be intense although it usually extends over a considerable area.

(d). Distension appears in neglected cases after the onset of general peritonitis. As a primary symptom, due to the escape of gas from the bowel into the general peritoneal cavity, it is very rarely observed. It is scarcely necessary to add that operation should not be delayed until this symptom appears.

(e). Loss of liver dulness due to the presence of free gas in the peritoneal cavity, is a very infrequent symptom and should be entirely disregarded, for this same deviation from the normal percussion note may occur in healthy individuals from the temporary interposition of the transverse colon between the liver and the anterior abdominal wall.

(f). The presence of "shifting dulness," due to free fluid in the peritoneal cavity, together with dulness in one or both flanks, with the patient in the dorsal position, occurs only in the course of the subsequent peritonitis and even then may be very irregularly developed.

Probably of the greatest importance in facilitating diagnosis is the fact that from hour to hour the physical signs increase in intensity and extent, while the pulse increases in frequency. Considerable information is still further provided by repeated examinations of the blood. A search of the literature has failed to discover any observations of this character. In the case just reported there was an increase in the general leucocyte count. Another sign hitherto comparatively unused in this class of cases is the presence of an exaggerated hyperesthesia in the corresponding segment of the abdominal wall. This might serve as a valuable aid in diagnosis.

The difficulties of diagnosis are fully exemplified by a consideration of the following atypical cases, of which brief abstracts are given:

CASE 2. Kick by a horse. Slight general pain during the night, six hours after the accident. No increase in the pulse or temperature for twenty-four hours. No vomiting during the same time. Death thirty-three hours after the accident. Perforation of the ascending colon.

CASE 3. Walked two miles to be treated for contusion of the eye and elbow. No abdominal symptoms of any kind until twenty-four hours afterward when pain and vomiting developed. Operation forty-eight hours after accident. Laceration two feet below the pylorus. Death two hours after operation.

CASE 4. Man with hernia, which was struck by barrel. He walked home with no symptoms of any kind. On arrival, the testis was swollen and there were two attacks of vomiting, but no other abdominal symptoms. The pulse was 50. On the following day the pulse was 84 but no abdominal symptoms had appeared. On the third day the patient died suddenly. Autopsy showed a rent in the small intestine.

CASE 5. Soldier. Received a blow on the abdomen from a ramrod. Abdominal pain, increased by pressure, was the only symptom for eighteen hours. Then vomiting, rigidity and slight distension. Some improvement occurred ten hours later, and this was followed by a recurrence of the nausea, repeated vomiting, and death forty-six hours after the accident. Autopsy showed a rupture four feet below the duodenum.

CASE 6. Soldier. Kick by a horse. Developed no symptoms for twenty hours, when vomiting occurred, and physical examination showed tenderness on pressure in the right iliac fossa. Death occurred shortly afterward and autopsy showed a perforation of the small intestine.

CASE 7. After falling down, another man fell on patient's abdomen. Patient walked to hospital and showed no sign of serious injury or shock. He slept well. On the following day he felt "uncomfortable" in his "insides" and took castor oil without effect. He vomited that same afternoon. Three and one-half days after the accident he returned to the hospital with general distension, rigidity and an immobile abdomen. On operation, two perforations were found in the lower ileum, one transverse, and the other longitudinal to the axis of the gut.

CASE 8. Male; 41. Caught between two buffers. Only slight tenderness and nausea until the evening of the second day, when the temperature rose to 103° and the pulse became much more rapid and feeble. Death on the third day, preceded by vomiting. No distension. Rupture of the ileum was found.

In the three following cases, typical symptoms, appearing shortly after the trauma and indicating rup-

ture of the intestine, disappeared after a variable number of hours almost completely. Subsequently, peritonitis rapidly developed, however, in each instance with a fatal termination.

CASE 9. Stableman; 30. Kick by horse. There was immediate shock, vomiting, severe pain and tenderness in the abdomen. There was muscular rigidity. All symptoms, with the exception of the pain, disappeared, and during the following day both the pulse and temperature were normal. Forty-eight hours after the accident the symptoms of incipient peritonitis developed and death occurred three days later. The autopsy showed a rupture of the ileum just above the cecum.

CASE 10. Man; 50. The button of a hernia truss was struck by the extremity of a pole. There was immediate pain and prostration, the patient being carried to his office. There was repeated vomiting and neither a movement of the bowels nor expulsion of flatus. On the following day, the vomiting had ceased and only slight abdominal pain and moderate tenderness on pressure persisted. Both pulse and temperature were normal. This same favorable condition continued for at least twenty-four hours when, after the administration of an enema, there was sudden collapse, the pulse rising quickly to between 130 and 140, the breathing becoming costal, and, shortly after, persistent vomiting. On operation, a rent was found in the lower part of the ileum. Death occurred, however, soon after.

CASE 11. Boy; 16. While under a cart, the patient's abdomen was stepped on by a horse. Patient tried to walk but after a few steps he fell to the ground because of pain and vomiting. Three hours after, the pulse was 116 but the pain and vomiting had disappeared. There was no tenderness to light pressure. Five and one-half hours after, the boy was still free from pain and had to be told to keep still. Twenty-four hours after, the pulse rose to 150, "coffee ground" vomiting became incessant, and the symptoms of collapse rapidly developed, death occurring shortly afterward. Autopsy showed between one and two pints of bloody fluid in the peritoneal cavity, and a rupture at the beginning of the jejunum.

The following case is of interest because, notwithstanding a rapidly fatal termination, there was an almost total absence of abdominal symptoms.

CASE 12. Man; 62. Kicked by a horse. Complained of pain and one attack of vomiting. There was neither distension nor tenderness in any part of the abdomen and the patient could lie in any position in bed and sit up without discomfort. The pulse was "good and full." On the following day both distension and rigidity appeared and the patient died twenty hours after the accident, in collapse. Autopsy showed a rent in the ileum just above the ileo-cecal valve, with fecal extravasation into the peritoneal cavity.

CASE 13 is also of interest because of the fact that twenty-four hours after the accident the patient walked across the floor to the examining table with a pulse of 80, notwithstanding the presence of a perforation in the small intestine. (See list of cases of operation with recovery.—Table II.)

The writer has also found a number of instances in which vomiting was delayed from twenty-four to thirty-six hours, and in the majority of these cases a fatal termination ensued. This, however, is not at all surprising, for the absence of this symptom in acute septic abdominal conditions from other causes is sometimes observed, and even in fatal cases of peritonitis vomiting may be either entirely lacking or of but very infrequent occurrence.

CASE 42. Man; 72. Struck by falling spar over the right shoulder and right side of the body. Four hours after, patient walked several blocks to the hospital, complaining of inability to use the arm and a feeling of slight distension in the right side of the abdomen with some slight pain.

Examination revealed a fracture of the right clavicle. Palpation of the abdomen revealed only localized tenderness in the lower right quadrant without the presence of any other symptom. Even muscular rigidity was absent. Both pulse and respiration were normal, and the respiration was diaphragmatic and caused no pain. This favorable condition continued for twenty-six hours, when suddenly, without warning, the patient went into collapse and died. He had refused operation in case any indication for it should occur during the progress of the case. Autopsy showed a rupture of the ileum about three feet above the ileo-cecal valve.

This rather wide variability in the character of the symptoms and the clinical course of rupture of the intestine can be accounted for, in part at least, by the difference in the extent, location and character of the lesion. The rupture may be either single or multiple and the tear may be either parallel with, or at right angles to, the long axis of the gut, or both. (CASE 7.) It usually divides only a portion of the circumference, although rarely complete division of a loop of intestine has been observed, especially at the jejuno-duodenal angle. In other cases, the orifice leading into the interior of the gut may be so small that any escape of its contents is either altogether absent or at all events is postponed by the valve-like action of the everted mucous membrane. Such a condition readily explains those atypical cases in which the advent of alarming symptoms occurs only after the expiration of a number of hours or even of days. A similar clinical course may also be accounted for by the fact that the damaged portion of the intestine, although still intact, may yet have been so severely bruised by the force of the trauma that necrosis ensues, subsequent perforation taking place when the necrotic segment becomes detached from the viable part of the gut. Even in these cases, however, nature may forestall any seri-

ous consequence of the perforation by protecting the weakened area with adherent omentum and coils of intestine. It is well, however, in cases of laparotomy for this condition, to make a thorough search for such weakened segments of the intestinal wall, even when actual tear or perforation has been found elsewhere and remedied, and to infold them, if not too extensive, by bringing the adjacent healthy serous membrane over them with Lembert or purse-string sutures, rather than to depend upon the skill of nature to complete the reparative process without the development of a subsequent septic peritonitis.

The clinical picture may be still further varied by an associated tear of the corresponding mesentery and of its contained bloodvessels. Thus, in complete division at the jejuno-duodenal angle the main trunk of the adjacent superior mesenteric artery has been divided, with a rapidly fatal hemorrhage. An equally fatal, although more slowly developing hemorrhage may follow a tear which, continuous with that in the wall of the intestine, extends to a point near the vertebral attachment of the mesentery, dividing some artery of considerable size; or extensive hemorrhage may be associated where, either with or without laceration of the gut, the mesentery is detached for a number of inches from its visceral attachment. Such interference with the viability of the gut may demand the resection of the affected portion; although where the fissure in the mesentery is at right angles to the lumen of the gut, mere ligature of the bleeding points may be sufficient. Trendelenburg reports several cases of subcutaneous laceration of the small intestine where the serous and mucous coats were reflected for a distance of several inches, leaving the intact mucosa and submucosa exposed, a condition requiring resection for its relief. Finally, resection would also be demanded in those cases of extensive bruising of the intestine in which the major portion of the circumference of the wall of the gut was involved.

The duration of fatal cases of rupture of the small intestine without extensive associated hemorrhage or damage to other viscera, does not seem to be governed by any well-defined limitation. In some, death takes place within a few hours after the accident, and is due more to the intensity of the shock than to any other factor. Thus Mackenzie ("Cases 14"), has collected eleven cases in which, in the absence of operation, death occurred in 7, 12, 24 (2), 29, 30 (2) and 58 hours, and 3, 5, and 8 days, respectively, after the accident; and the statement is made that the autopsy showed that in all but one peritonitis was the cause of death. Very likely, however, peritonitis was only a contributing factor, especially in those cases that ran their course within twenty-four hours.

That a certain relation exists between the situation of the tear and the length of time before a fatal issue ensues seems to be well demonstrated in the following series of cases. (Table I.)

Analysis of this table (page 294) shows that in all the cases but one there was a fatal termination, in other words, that a relatively small number was benefited by the operation, and that of those upon whom an operation was done as well as in those cases in which no operation was attempted, death in the patient occurred usually within 48 hours after the accident. Thus, in five cases, in the absence of operation, the patient died in 24, 31, 36, 41 and 48 hours, respectively, after the accident. In seven cases where operation was done in 5½, 7½, 24, 28, 48 and 60 hours after the accident, the patients survived 6 days, 18 hours, 36, 23, 12 and 2 hours, respectively, after the operation. In one case (Berg), where the primary operation was done 24 hours after the accident and a secondary operation a few days later for obstruction from a band, recovery ultimately took place. The writer has also collected all the cases in which recovery followed operation (Table II), irrespective of the situation of the rent, but has attempted to formulate no actual percentage of mortality because of the fact that, unfortunately, many, if not the majority of deaths occurring after operation for this condition, are never published.

It is advisable in this connection to briefly outline a suitable operative procedure for these cases and at the same time to call attention to the different ways in which the toilet of the peritoneal cavity was carried out and to the various methods of drainage that were employed.

After every abdominal trauma, where the symptoms indicate only a suspicion of rupture, the need of exploration at the earliest possible moment cannot be too strongly emphasized. In the absence of any special guide, the median incision is preferable, although in other cases the incision is frequently made advantageously over the point of maximum rigidity. In rupture of the intestine within a hernial sac, exploration of the interior of the sac is first carried out, and is followed by the exploration of the adjacent part of the abdominal cavity by the prolongation of the incision upward, for the reason that the ruptured loop usually is not far distant from the internal ring. In the list of recoveries (Table II), two successful operations of this kind are noted.

On opening the abdominal cavity, serious damage to one or other of its contents is indicated by the presence of a valuable quantity of blood and, not in-

TABLE I. TEAR AT OR BELOW JEJUNO-DUODENAL ANGLE.

Case. Trauma.	*Character of Symptoms.*	*Op.*	*Result. Autopsy.*
CASE 14. Fell two feet against horizontal bar.	Immediate pain with pulse rate increasing to 120. Thirst. General distension. Tympanites. No flatus or movement.	24 hrs.	Perforation in jejunum, close to duodenum. Death thirty-six hours after operation.
CASE 15. Adult. Kick of horse.	Immediate pain. Shock. Rigidity and dulness anteriorly. Lay on side with knees flexed.	5½ hrs.	Free bleeding from mesentery. Three ruptures, two complete, the highest twenty inches from pylorus. Death on sixth day.
CASE 16. Adult. Blow on abdomen from ramrod.	Serious symptoms after eighteen hours. Death in forty-eight hours.	No.	Peritonitis. Rupture four and one-half feet below the duodenum.
CASE 17. Child. Run over.	Admitted twenty-four hours after accident, having had one attack of vomiting after medicine. General distension and rigidity. Shifting dulness and loss of liver dulness. Pulse 116.	24 hrs.	Small rent at the jejuno-duodenal angle. Closure with small drain. Subsequent obstruction from band required a second laparotomy. Ultimate recovery.
CASE 18. Adult. Struck against corner of table.	Immediate collapse, decreasing, with improvement of the pulse. Abdominal muscles rigid and contracted. Pain the chief symptom.	28 hrs.	Rupture eighteen inches below the duodenum. Death fifty-one hours after the accident.
CASE 19. Boy. Horse stepped on abdomen.	See previous history.	No.	One to two pints of bloody fluid in peritoneum. Rupture at the beginning. Death in about thirty-six hours.
CASE 20. Boy. Fell one story, striking the head of a passer-by.	Pain, tenderness and vomiting. Gradual rise in pulse to 100 in the first sixteen hours. Then the abdomen was soft without distension. No flatus or movement. Twenty-two hours after, renewed vomiting.	60 hrs.	Perforation and multiple bruises in upper part of jejunum, necessitating resection. Death twelve hours afterward. Peritonitis.
CASE 21. Soldier. Kick by horse.	General abdominal pain and moderate shock. Rigidity nine hours after gradual rise in pulse to 104. No vomiting, nausea or stool until thirty-six hours after accident. Death in forty-one hours.	No.	Jejunum, three feet below the duodenum. General peritonitis.
CASE 22. Age 24. Trauma, character not stated.	Abdominal symptoms delayed for several hours.	48 hrs.	Two feet below. Death two hours later.
CASE 23. Boy. Struck abdomen on ridge of roof.	Abdominal pain, feeble pulse, vomiting, faintness. Walked one mile to hospital. On following day distension, pulse over 100.	No.	Rupture at the beginning of the jejunum. Death thirty-one hours after the accident.
CASE 24. Adult. Fell from scaffold.	Semi-comatose. Seemed in great pain. Temp. 102°, pulse 148, feeble and intermittent. Repeated vomiting. Later, distressing hiccough. Death in twenty-four hours.	No.	Complete tear at junction.
CASE 25. Adult. Struck violently across lower part of abdomen.	Great collapse and imperceptible pulse. Tenderness in umbilical and epigastric regions. Abdomen retracted. Increasing rigidity and pain.	7½ hrs.	Rent eighteen inches below the duodenum. Death in eighteen hours.

TABLE II. RECOVERIES.

Case.	*Character of Symptoms.*	*Operation.*	*Year and Operator.*
CASE 26. Man; 40. Possible kick by horse.	Repeated vomiting. Moderate shock. Moderate tenderness and rigidity in right lumbar region.	Sixteen hours. Perforation of small intestine. Serum in pelvis. Suture and drainage.	Lund, 1902.
CASE 27. Man; 28. Kick by horse on truss.	Only slight nausea at time. Six hours after, good result from enema. Some tenderness and spasm in lower half of abdomen.	Nine hours after. First sac, then abdomen opened, containing turbid fluid. Small intestine ruptured and several suspicious places turned in. Suture and drainage.	Lund, 1902.
CASE 28. Man; 42. Kick by horse.	Knocked down. Immediate nausea and vomiting. No distension, but general tenderness and rigidity.	Three hours after. Clear serum, tinged with blood. Perforation eighteen inches from ileo-cecal valve. Much fecal material in pelvis. Suture and drainage.	Lund, 1902.
CASE 29. Boy. Run over.	Pain about umbilicus. Repeated vomiting. No distension. General tenderness and muscular spasm on right side.	Immediate operation. Blood-tinged serum. Perforation in center of ileum. Suture; hot saline irrigation. Tubes and wicks in both flanks and pelvis. Recovery.	Lund, 1902.
CASE 30. Man; 48. Trauma on truss button.	Immediate pain, vomiting and distension. Pulse 90.	Thirty-eight hours after. Perforation of small intestine near internal ring. Suture; drainage. Recovery.	Von Mosetig-Moerhof, 1902.
CASE 31. Child; 10. Run over.	See history in Table I. Case 17.)	Twenty-four hours after. Suture of small rent. Irrigation; drainage. Secondary obstruction. Ultimate recovery.	Berg, 1901.
CASE 32. Soldier. Kick by horse.	Immediate pain, increased on taking opium. This the only symptom or physical sign mentioned.	Eleven hours after. Transverse tear, small intestine. Warm boric acid irrigation. Recovery. No mention of drain.	Moty, 1898.
CASE 33. Man; 29. Kick of horse.	Persistent vomiting and atrocious pain all night. Stupor. Next morning vomiting ceased. Distension. Tenderness at point of contusion. Pulse 102; temperature 36.6° C.; Facies.	Mid-laparotomy, fifteen hours after. Rupture, free border of small intestine. Suture; Mikulicz drain and lavage with boiled water.	Nelaton, 1892.
CASE 34. Boy; 13. Run over.	Pallor, collapse. Pulse 78, small and feeble. Pain in back. Abdomen slightly retracted; not hard or very tender. In three hours, hard abdomen, vomiting, rigidity and pulse 100.	Two and one-half hours after. Blood-stained fluid and free gas. Transverse tear of ileum. Little escape of feces. Suture; local lavage. Persistent vomiting for four days. Complete closure. No drain.	Walsham, 1899.
CASE 35. Man; 54. Blow from axe handle.	Three hours after, paroxysmal pain; retching but no vomiting. Abdominal facies.	Ten hours after. Yellow-brown fluid in peritoneum, which was "mopped" out. "Abdomen closed."	Smith, 1902.
CASE 36. Man; 37. Kick by horse.	Abdominal pain, no shock. Stands more comfortably than he lies. One attack of vomiting. Three hours after, increasing pain and rigidity.	Rupture middle of jejunum. Peritoneum cleansed without irrigation. Complete closure without drainage.	Pitts, 1897.

TABLE II.—(*Continued.*)

Case.	*Character of Symptoms.*	*Operation.*	*Year and Operator.*
CASE 37. Boy; 14. Kick by horse.	Three hours after, brought to hospital because of increasing pain; no vomiting at any time. Lies on side with knees flexed. Pulse 80, temperature 100. Ten hours after, rigidity and tenderness. No distension.	Operation eighteen hours after. Rupture of ileum. Resection because of contusion. Irrigation with 20% boric acid solution. Closed without drainage.	Croft, 1890.
CASE 38. Man; 55. Struck against edge of chair.	Immediate, sharp pain and repeated vomiting, which continued, with increasing distension, until examination twenty-four hours later, when he walked across floor with pulse 80. Tender and rigid.	Perforation of small intestine. Irrigation of abdomen with 1-100 carbolic acid solution. Small glass drain. Recovery with some superficial cellulitis of the external wound.	Thomas, 1894.
CASE 39. Man; 37. Kick by horse.	Pain, tenderness, rigidity and vomiting, with pulse 100, five and one-half hours after accident.	Operation in seven hours. Rupture of small intestine. Food in peritoneal cavity. Abdomen cleaned with sponges. Wound closed without drainage.	Thurston, 1898.
CASE 40. Man; 26. Struck by piece of wood.	Vomiting ten minutes after accident; repeated. Rigidity and tenderness, especially in right iliac fossa. Legs flexed. Pulse 88.	Operation in eight and one-quarter hours. Rent in cecum. Irrigation with sterile water. Gauze drain to line of suture.	Thurston, 1899.

frequently, in rupture of the intestine, by a certain amount of intestinal contents in the peritoneal cavity. In the course of several hours, with sero-turbid fluid with sufficient fibrin to possibly mat together several adjacent reddened, congested coils of intestine, evidences of an incipient peritonitis may be observed. The entire length of the alimentary canal is then inspected and any rupture or bruised segment appropriately treated. In conducting this search, the fact that one or both of these pathological conditions may be multiple must be carefully kept in mind. Suture, resection, or the turning in of the bruised segment, must then be carried out. Inspection of the tabulated list of cases shows that all but one were treated by suture, the exception being case 18, in which a segment of the ileum of questionable viability was resected because of extensive contusion.

After the ruptured or bruised intestine has been cared for, the peritoneal cavity is cleansed by either local or general saline irrigation, according to the extent of the associated congestion. It is interesting to note, in this connection, that the method of cleansing just suggested was by no means always practised in the list of successful cases. In case 31, the peritoneal cavity was flushed with a "warm" boric acid solution; in case 19 with a solution of carbolic acid, 1 to 100 (followed by some superficial cellulitis); in case 18, with a solution of 20% boric acid, in several others by hot water. In case 16, the peritoneal cavity was closed without irrigation of any kind.

The question of drainage, and the amount to be employed, is also of interest. In four cases, 35, 18, 16 and 33, the abdomen was closed without drainage. In one, no mention is made of the use of a drain. In the others, some kind of drainage was employed, either in the shape of a glass drain, a drain of gauze or of rubber, and in case 28 tubes and wicks were introduced into both flanks (counter-opening) and pelvis," although the operation was done immediately after the accident had occurred.

In the writer's case already referred to (case 1), partial saline irrigation, with drainage of the pelvis and of the site of suture with cigarette drains was practised, the operation being done about 8 hours after the accident.

At the present time, the use of a drain seems to depend upon whether the peritoneal cavity can be adequately cleansed or not. Should this prove impossible or dubious, one or more "cigarette" drains may be employed. In the tabulated list of recoveries where the abdomen was closed without drainage,

the operation was done two and one-half (case 33), three (case 16), seven (case 35), and 18 hours (case 18), respectively, after the accident, in other words, at a time when the peritoneal cavity could probably be adequately cleaned. In the other cases of recovery where drainage was employed, the operation is described as having been "immediate," 3, 9, 10, 11, 15, 16, 24 (2), and 38 hours, respectively, after the accident, figures which seem to carry out the well-known fact that, in order to achieve success, the operation must be done at the earliest possible moment after the trauma has been received. As in all similar laparotomies, success depends also, in a measure, upon the celerity with which the operation is performed, as well as upon the avoidance of all unnecessary manipulation of the abdominal contents.

In a suspicious case, should no rupture or other damage to any abdominal viscus be found, the exploration has at all events determined the question of diagnosis and has not materially threatened the ultimate recovery of the patient.

(To be continued.)

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THE SURGERY OF THE TYMPANO-MASTOID REGION OF THE INFANT AND YOUNG CHILD.

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For the cure of suppurative conditions in infants and young children the successful surgery of the tympano-mastoid region differs essentially from the operative procedures in vogue for adults. No text-book on otological surgery would be considered complete without a description of the simple and radical mastoid operations; yet we find the anatomical peculiarities of the infant's and child's temporal bone described only in scattered paragraphs, and I know of no clear and consecutive narrative of the steps of these operations, outlining the guiding landmarks as they exist in the young subjects.

This is the more strange when it is remembered that the temporal bone of the infant and the child is a developing bone, differing from the adult specimen distinctly and sharply. At various ages the interrelation of the parts is different from that in the adult, and consequently must be approached with other measures to meet the surgical requirements. To proceed in the same way as in the adult is to invite disaster, increase the dangers to the facial nerve, and unnecessarily open the cranial cavity.

That mastoid operation is worthy of general adoption which most nearly meets the indications for surgical interference with the minimum amount of danger not only to the patient's life, but also to his future health, and the procedure hereinafter outlined has seemed to afford me the best measure by

which the suppurating contents of an antrum empyema could be cured, accompanied or unaccompanied, as it may be, by mastoiditis.

ANATOMICAL PECULIARITIES:

It is not my purpose here to rewrite the anatomy of the temporal bone, but to call attention to certain peculiarities of the child's temporo-mastoid region in sufficiently detailed a manner to make clear why I have adopted the advocated procedure.

The external auditory canal and its relations to the surrounding bony structures are of vital importance to the surgery of this region. Closely adherent to the superficies meatus, its roof follows the contour of the squamosa. The osseous part is relatively shorter in young children than in the adult. At birth only

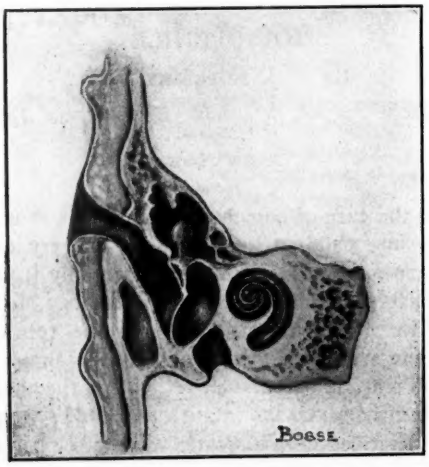

Fig. 1. Fronto-vertical section through the external auditory canal, the drum and the pyramid of a year old child, showing the direction of the canal, its attachment to the superficies meatus, and the nearness of the middle ear to the surface of the skull. The thin wall of bone separating the tympanic cavity from the jugular bulb is also indicated. (Drawing partly schematic, after Gomperz.)

a ring, it becomes a broader segment of bone as age increases, until between the third and the sixth year, varying individually in different subjects, it takes on the adult type. Although the osseous canal is much shorter in the child, the canal in its entirety is relatively as long as in the adult, the difference being made up by the soft parts. Its direction from the concha is, generally speaking, downward, forward and inward. See Figure 1.

Symington, in an exhaustive study of the meatus of childhood (The External Auditory Meatus in the Child—*Journal of Anatomy and Physiology*, Vol. XIX, 1885, p. 111), gives the length of the canal for the various ages as follows:

Age	Floor	Roof
2 months	17 mm.	13 mm.
6 "	19 "	14 "
1 year	20 "	15 "
2 "	22 "	16 "
5 "	23 "	17 "
6 "	24 "	17 "

From this table the angle of inclination of the drum to the horizontal axis of the canal is outlined. Noteworthy is the fact that in early age the roof of the canal is bounded superficially by the superficies meatus. This superficies meatus is the bent part of the squamous plate overlying the additus. See Figure 2.

From the direction of the superficies meatus and the external auditory canal, it follows that the at-

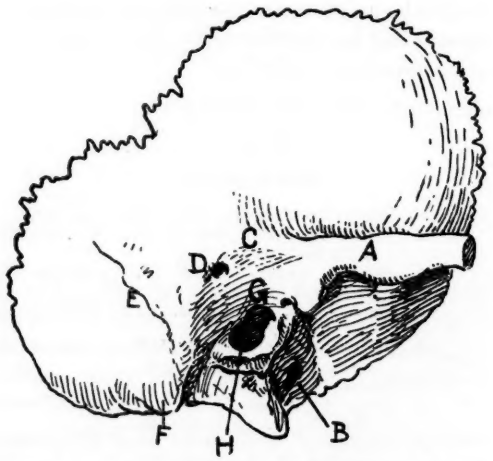

Fig. 2. Outline drawing of the temporal bone of a two and one-half year old child, showing landmarks. A—Zygomatic process. B—A defect in the ossification of the anterior inferior bony wall of the external auditory canal. C—Supramastoidal crest. D—Point of election for entering the antrum. E—Squamo-mastoidal suture. F—Rudimentary mastoid process. G—Superficies meatus. H—Osseous opening of the external auditory canal.

tachment of the auricle to the underlying bony parts is at a higher level than that of the tympanic membrane, and *the line of incision which is to give approach to the middle ear in the child will have to be brought to a higher level than the annulus tympanicus,* and the superior wall of the external auditory canal must be separated at its roof from the superficies meatus.

The separation of the soft external auditory canal from the superficies meatus must be carefully carried out in retracting the soft parts to expose the bony surface above the annulus tympanicus. I have never found it necessary to incise the canal to view the tympanic membrane through it, so as to identify

it, as recommended by S. Oppenheimer (Surgery of the Middle Ear and Mastoid, 1906), and I consider the possibility of infecting the cartilaginous and soft parts of the external ear as a danger, when such a procedure is attempted.

The next anatomical structure peculiar to the young, the existence of which, so far as this stage of the operative procedure is concerned, will be of importance only when operating on infants and young children, is the masto-squamous suture. This suture is found externally on the temporal bone, in the very young unossified, in older subjects ossified, but equally well marked, extending downward from a small distance above the temporal ridge, marking off the squamous plate from the more or less rudimentary mastoid process. It occasionally persists through life, is usually wide in infancy and early childhood, and the *primary incision,* when made down through the skin to the bone, *should be carried backward toward the mastoid tip to prevent the knife from entering the squamo-mastoid suture* and injuring the soft parts at its line, or the facial nerve at its point of emergence from the skull, this nerve having a very superficial point of emergence during the early period of life. Oppenheimer (l.c.) quotes Stiles as having called attention to this danger, and McEwen (Pyogenic Diseases of the Brain and Spinal Cord), found this suture persistent on the operation table in cases aged twelve, thirteen, fourteen, eighteen and twenty-nine years.

On the inner aspect of the temporal bone, along the line of the squamo-mastoid suture, we find the petro-squamosal suture, containing, in the young, the petro-squamosal sinus. While this is not of very great surgical importance, still, when retracting the soft parts, should the petro-squamosal sinus persist, its injury may result in directly infecting the cranial cavity with its contents. Furthermore, the squamo-mastoid suture marks the lower and posterior limit of the descending plate of the squama, and this is the line behind which we must expect to find the sigmoid sinus. No matter how small the temporal bone, it is rare, indeed, to find the sinus further forward than the external evidence presented by this suture. See Figure 2.

Our next step in the procedure is to determine the place for opening the antrum. In very young children the antrum is all there is of the mastoid. The purulent disease in these cases is really an antrum empyema (Körner), the mastoid process being rudimentary.

The mastoid antrum and middle ear are much nearer the surface of the skull in the young than in the adult, and their position relative to the overlying parts differs so much from the adult type that other landmarks must be relied upon to locate it. Neither the spine of Henle nor the suprameatal triangle is a sufficiently constant guide for the safe performance of the operation. Of all the landmarks, the most constant is the ridge of bone formed by the posterior root of the zygoma. This ridge, by its lower border, indicates the level of the roof of the mastoid antrum, above which, a few lines in distance, will be found the level of the base of the brain. This ridge, sometimes designated as the supramastoidal crest, is formed by the obliquity of the angle between the auditory plate of the squama (in the young), and the rest of the squama. It is sufficiently constant to furnish a reliable guide to the upper limit of safety in entering the antrum and avoiding the cranial cavity. See Figure 2.

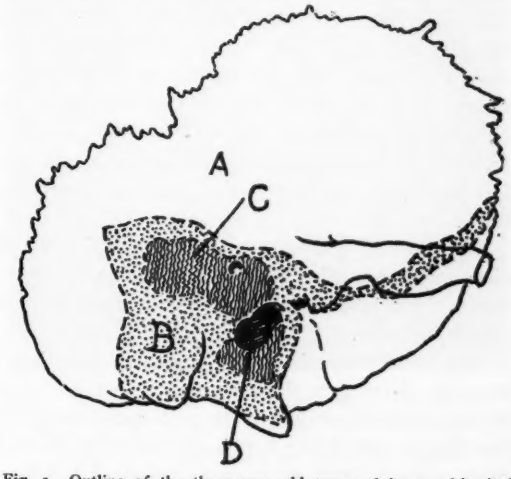

Fig. 3. Outline of the three year old temporal bone, with shaded portion showing as cut in Fig. 7, on the external surface of the skull. A—Outline of the temporal bone. B—The line through which the section was made to expose C—The middle ear and antrum on the external surface of the skull. (Drawing from author's specimen.)

The tympanic cavity communicates with the antrum by means of the additus ad antrum and the epitympanic space, commonly and erroneously designated the attic. The epitympanic space is that portion of the tympanic cavity lying superior to a line passing through the short process of the malleus, and containing the head and neck of this ossicle and the short process and body of the incus. Locating the epitympanic space on the external surface of the skull, we find it, in the child, directly above the tympanic membrane, almost in the middle of the upper part of the arch spanning the annulus tympanicus. Posterior to it, the antrum inclines slightly toward the back of the head as the child ages, until this cavity presents itself as usually found in the adult type of bone. See Figures 3 and 7.

THE SIMPLE OPERATION:

Therefore, the soft parts retracted, the external auditory canal separated from the underlying bone, the root of the zygoma and the supramastoidal crest identified, and the position of the squamo-mastoidal suture determined, we next proceed *to demolish the outer wall of the antrum,* which, lying high, *is opened at a point a few lines behind and above a plane drawn through the handle of the malleus.* Opening the antrum thus, the facial nerve is avoided, being protected in this region by the overhanging horizontal semicircular canal. (See Figure 8.) From this opening the cortex is easily removed backward toward the squamo-mastoidal suture, the underlying bone and cell detritus removed with the spoon curette and sponges, and the purulent contents completely eviscerated. As we reach the squamo-mastoidal suture, a hard plate of bone is encountered—the inner table of the skull—and under this the sinus is to be expected. I have never found it necessary to curette the additus in the simple mastoid operation on the child, nor do I permit the curette to enter the epitympanic space. The danger of dislocating the ossicles, or of injuring the facial nerve has always seemed to me too great to hazard such risks.

The operation as above described affords sufficient counter-opening to effect drainage, paracentesis having been performed before the case comes to the operating table.

The usual result from this operative procedure is to give clean granulating surfaces which, under proper precautions during the post-operative period, the skin wound being kept open until the granulations reach its level, heal entirely without trouble or incident. See Figure 5.

To summarize the successive steps of the simple tympano-mastoid operation on the young:

1. Primary incision through the skin and soft parts, down through the periosteum to the bone, the incision starting directly over the middle of the mastoid tip and being carried by a curvilinear sweep toward the auricular attachment upward to the upper pole of its insertion, distant one-quarter inch from it. (See Figure 4.) I prefer to make this incision from below upward, for this furnishes another guard against injury to the facial nerve at its point of emergence from the skull.

2. Gentle efforts to retract the wound edges are now begun. Periosteum is pushed backward beyond the squamo-mastoid suture; the auricle, gently bent forward on itself, is pulled forward and downward; the soft external auditory canal is carefully separated at its roof from its adhesions to the superficies meatus; and then the external ear, with its canal, is pushed forward and downward until the tympanic membrane is seen. This must positively be identified. Bleeding points have in the meanwhile been secured, and the operative field is now exposed.

3. We next identify the landmarks, the zygomatic root, the ridge running from it, and the squamo-mastoid suture. The point of selection for entering the mastoid antrum is then located, provided no fistulous opening already points the way to the suppurating cavity. This point of selection is directly above and a little behind the arch of bone spanning the upper pole of the membrana tympani, and with a slight tap of the chisel the bony wall is broken through. Occasionally, a "spongy spot" is discernible, and many authors follow this as a guide through which to enter the antrum. Personally, I have not found it a reliable sign. Many children's bones were found to be of so vascular a structure that its demarcation from the surrounding bone tissue was not always clear.

Fig. 4. Showing the line of primary incision from the middle of the mastoid tip upward. The auricle turned forward.

4. The antrum open, the cortex is easily removed, by means of a curette, backward to the tip, care being exercised as the squamo-mastoid suture is approached. The tip is removed, leaving only a shell of bone, and the operation is completed by removing all diseased tissue, not forgetting the cells at the root of the zygoma. Unless these cells are examined, and, if diseased, eviscerated, the object for which the operation was undertaken will be defeated.

5. The operative procedure closes by lightly packing the bone cavity with gauze. One strip of iodo-

formized gauze is placed in the deep part, and covered with plain sterile gauze in one strip, the end of which should protrude beyond the skin wound and be lost in the external dressings. This single strip packing will greatly facilitate proper drainage, and it is a better procedure than packing the cavity with small pieces. A strip of plain gauze is placed in the external auditory canal, and the external dressings are applied.

Regarding the change of dressings, it can be said that the longer the primary dressings are left in place the better, and although the outside dressing and bandage may require change because of soiling,

Fig. 5. The bone surgery completed in the performance of the simple tympano-mastoid operation on the two and one-half years old subject. (Drawing from author's specimen.)

it is better to wait until the mastoid cavity has begun to discharge (after five days), and the packing becomes thoroughly wet, before its removal is attempted, because then the change of dressing is less painful, and consequently will not be resented by the young patient. However, should there be any indication for an earlier inspection of the wound cavity, this should be undertaken as soon as it is required.

THE RADICAL OPERATION:

The location of the landmarks, and the initial steps leading the way to the antrum, are similar when performing the *radical operation* to those in the simple procedure as above described. The peculiarities of the temporal bone of the young which it is necessary to mark for the correct and safe performance of the radical operation, are, first, the spot where the least danger exists in connecting the antral cavity, as opened in the simple procedure, with the tympanic cavity, so as to form one connecting cavity. Here the danger of dislocating the ossicles plays no rôle, but the chance of injury to the facial nerve is a potent danger. Every effort should be made to avoid it, since, as McEwan has pointed out, injury to the facial in infancy or during the active developmental period of the facial bones and muscles, will arrest growth on that side and lead to disfigurements in excess of that caused only by motorial paralysis.

The nearer we make the connecting passage to the zygomatic root the safer the procedure. I have repeatedly tried this on the cadaver and have since verified it at the operating table, and I now feel that by *breaking through from the antral opening directly above or near the position held by the malleus* there is afforded an absolutely safe route for the primary step; the facial nerve, at this point having passed into the deeper parts of the petrosal pyramid, is not within range of the chisel or gouge, when these are carefully used.

Fig. 6. The radical operation completed up to the removal of the ossicles. The point of breaking through from the antral opening to the tympanic cavity is shown. The anterior and inferior wall of the osseous external canal has been removed to better expose the unremoved ossicles. Author's specimen, aged two years.

We break down the root of the zygoma, and remove the remaining portions of the ossicular chain, endeavoring to keep the stapes intact and *in situ*, or at least to maintain its foot-plate in position. See Figure 6.

The antral opening connected with the tympanic cavity, this cavity itself next receives our attention. In the child this cavity presents two characteristics peculiar to its stage of development. First,

the mouth of the Eustachian tube is wide and easily entered by a small curette; the bony walls are exceedingly thin, and great care must be exercised lest in curetting the bony wall separating it from the carotid, this wall be injured to the damage of that vessel.

The second characteristic of the child's tympanic cavity is its floor which, covering the jugular bulb, is a very thin plate of bone. I have often found defects in this floor, with the dome of the jugular bulb in direct contact with the lining membrane of the tympanum, hence I recommend the utmost care when curetting in this neighborhood. See Figure 7.

Unhappily, the amount of material is not large enough (four times in ten examinations), to warrant me in citing my statistics, but the presence of

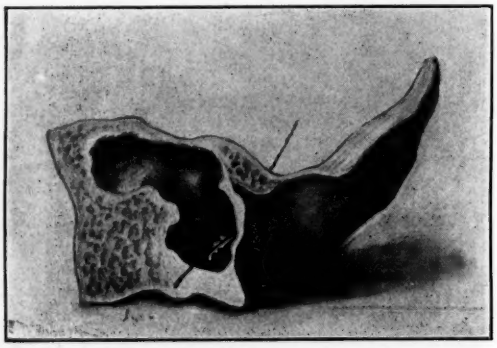

Fig. 7. A section cut as indicated in the shaded portion of Fig. 3, showing middle ear (tympanic cavity), additus ad antrum, and antrum. A bristle has been passed through the existing defect in the tympanic floor coming out through the roof of the jugular bulb. Author's specimen, aged two years.

these dehiscences in the floor of the tympanic cavity has occurred sufficiently often to impress upon me the danger of rupturing the jugular bulb, and I have discarded all sharp instruments in this region, contenting myself with a thorough sponging with gauze until satisfied that the bony floor is intact.*

The tympanic cavity cleared of granulations and detritus, the partition dividing it from the antrum is removed under full illumination, and the facial canal, standing white and hard (at times evidencing dehiscences in its wall with the nerve exposed), is located against the darker spongy bone. The little bridge between antral opening and tympanic cavity is gradually broken away in small pieces and the radical operation—that is, the formation of a large, irregular connecting cavity, merging tympanic, antral and mastoid cavities—is finished.

* Dr. R. Johnson Held has informed me of a case in his surgical practice where this defect in the floor of the tympanic cavity persisted to adult life, and where, at operation, through curetting the tympanic floor, the dome of the jugular bulb was injured, necessitating ligature of the jugular vein. (Personal communication—case to be published shortly.)

That is to say, the bone surgery is now completed, but to insure the best results a flap is cut from the soft tissues of the external auditory canal, so that the cavity may more rapidly become filled by granulations and its interior epidermalized. This flap must be so constructed as to provide easy access for treating any part of the bony cavity during the post-operative period.

The flap best adapted to children's cases has proved, in my experience, to be that devised by Panse. After the flap has been cut the edges are turned back and held in place by small pledgets of gauze. I find it best, in children, not to suture the post-auricular wound, but to encourage healing by granulation. The wound is packed with the regard to holding the flaps in position, in a way similar to that described for the packing of the simple operation. The dressings remain unchanged until after the sixth day, when I have usually found the flap edges adherent. Further treatment of the wound differs in no way from that after the simple procedure.

The advantage of this method of handling the flap lies in the fact that it is cut at the time of operation, requiring no second anesthetization of the patient, and the wound remaining open behind facilitates approach to the middle ear for treatment and inspection during the healing period. The end results, so far as cosmetic effects are concerned, are as good as when the flap is primarily sutured, provided care be taken to prevent the edges of the skin from turning in during the progress of healing.

To summarize the steps of the radical operation:

1. After the antrum has been opened and the evisceration of the tympano-mastoid cell has been completed, the bridge of bone arching the tympanic ring is broken through from a point as near the middle of the superficies meatus as it is possible to go, nearing the zygomatic root rather than inclining away from it.

2. Granulations and detritus are removed from the tympanic cavity, including diseased ossicles.

3. Careful curettage of the Eustachian orifice.

4. Careful sponging of the floor of the tympanic cavity to identify dehiscences, and if such are found absent, then curettage of the floor. When dehiscences are identified, diseased tissue must be removed through sponging or by the use of thumb forceps.

5. Cutting the Panse flap and tamponing the edges of this flap in position through the external ear, packing the post-auricular wound with one strip of gauze, and finally placing the outside dressings in position.

FAULTS OF TECHNIC: The osseus canal being less and less evident the younger the subject, the part played by the squamous must be remembered. As the result of the canal being attached at its roof to the superficies meatus, the auricle is situated high relative to the membrana tympani, and a common fault is failure to detach the canal roof from the bony wall, and because of this the cranial cavity is unnecessarily opened. I have found a false opening into the cranium, in a case under observation within the year, made because of this fault, and the operator in this case failed to uncover the antrum.

Contrary to the case in the adult, where the antrum is usually higher than is supposed, in the child it will be lower if the primary incision is not

Fig. 8. A section of the temporal bone of a two year old subject, through the facial in its descending line. The distance of the facial from the drum is evident, and the protection to the nerve afforded by the horizontal semicircular canal is shown by the overhang of this canal. The relations of the ossicle, as exposed, to the semicircular canal is also shown. Drawn from the author's specimen.

properly made and the soft canal carefully separated from the superficies meatus. Oppenheimer (l.c), calls attention to the fact that the squama, instead of occupying an almost vertical position, is inclined, making an acute angle with a horizontal plane, and causing the linea temporalis to overhang the external auditory canal. This overhang might be mistaken for the temporal ridge and the operator, instead of opening into the antrum, will open the cranial cavity. Through gentle persistence in retracting soft parts until the membrana tympani is recognized the unusual position of this ridge will be identified and this fault of technic averted. Many operators make the suprameatal triangle their guide. In the child neither this nor Henle's spine, if it be present, can be depended upon. The position of the antrum is so different at different ages that these landmarks can no longer be accepted as reliable guides in the surgery of this region in the young.

In closing this paper I wish to call attention to the red-marrow-bone character of the cells in the young subject. Very often, after the central focus of infection has been removed by the operator, he will proceed to eviscerate and enlarge the bony cavity indefinitely, expecting to find hard bone; but when it is remembered that in many cases the developing temporal bone of the child is soft and of red-marrow, and easily broken down with the curette, such a mistake of technic can hardly happen.

DRAINAGE OF THE PELVIC CAVITY OF THE MALE (IN PERITONITIS.)

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It must be a fact well recognized by all surgeons of experience that the successful management of infective inflammations of the peritoneum, of any extent, resolves itself largely into affording exit in the most expeditious manner possible to the products of such inflammation, in order that the patient may be spared a death from toxemia. An adequate provision for the escape of such products becomes an immediate and most urgent demand where the inflammation has not become circumscribed, but is proceeding, unhindered, by routes of least resistance, as determined by the anatomic characteristics of the part involved, to the ultimate involvement of a larger proportion of the peritoneal areas. Upon the promptness with which the measures are instituted, and the thoroughness with which they meet the requirement, it would seem the outcome in this class of cases to a large extent must depend.

In order that the drainage may most effectually meet the indications in any given case, reliance upon some routine plan of procedure must be discarded, and each case must be managed along lines indicated by the areas involved. This implies that the surgeon is to recognize, approximately, the source from which any given inflammation has its origin, and the division of the peritoneal cavity (arising from the projection into the general cavity of the abdominal viscera), in which the products of the inflammation are primarily to be found, as well as others into which extension is prone to occur, in order that drainage may be undertaken in a manner to prevent further extension. A desire that gravity might aid in the exit of the inflammatory products has led to openings for the transmission of the drainage tubes, etc., being placed in the most dependent part, as in the subrenal fossæ and in the pelvis of the female through the cul-de-sac of Douglas. That the favorable results obtained in drainage of the female pelvis might also be obtained in the male pelvis, in event of its being susceptible of being drained through the perineum, is a natural inference.

This led to our consideration, two and one-half

years ago, of the problems involved in the drainage of the pelvic cavity of the male pelvis through the perineum. While drainage of the pelvis in the female, by an opening through the posterior vaginal fornix into Douglas' pouch, is one of the simplest of procedures, for the posterior uterine wall affords us an infallible guide, and no strictures of importance are in danger of being damaged, the pelvic cavity of the male, by reason of the arrangement of its contained viscera, does not lend itself so readily to an opening into its most dependent part through the perineum. The intricate relation between the rectum and the bladder precludes the possibility of passing between these structures and opening the retrovesical pouch. This statement should probably be modified by saying that upon the cadaver this operation may be done by a somewhat careful dissection and without direct damage to either the bladder or bowel, or the important structures lying between them, viz., the ureters and vesiculæ seminales and ejaculatory ducts. But the length of time required—and in the class of cases where such drainage may be indicated this is an element of much importance—and the possible danger which it has seemed to us that there existed of pressure necrosis or obstruction of either ureter from the drainage tube employed, deterred us from the employment of this avenue. We have not viewed with favor a posterior route.

The pelvis may be readily entered, apparently without risk of damage to the afore-mentioned important structures, by an opening made by the side of the prostate and the posterior-lateral wall of the bladder, the point of emergence in the pelvic cavity being above and internal to the vas deferencs, between it and the bladder, just above the point where it leaves the pelvic wall to cross over to the posterior-lateral wall of the bladder. An opening into the pelvic cavity at this point will be in nearly as dependent a position as one made into the retrovesical pouch, and should consequently give nearly as good drainage, and it has the advantage of being rapidly made and seemingly without undue risks of damaging any structures of importance. The position of the vas is made out by following it down from the internal ring to the posterior wall of the bladder by palpation; or, locating the base of the prostate and passing an imaginary line from this to the internal ring, the space above and internal to this should be within the area of safety, barring the bladder.

This is the route we have followed so far in the cases here reported. Its employment in practice with us has been as follows: In cases where the drainage is recognized as being necessary prior to the operation—and this will generally be possible—the patient is so placed on the table as to expedite the operation as much as possible, for it is believed that these patients do not tolerate prolonged anesthesia and operative manipulation. The lower abdomen and perineal region, having been prepared in the usual way, are left exposed, the rest of the body being adequately protected against heat loss. The legs are slipped off from the operating table, hanging over its side, and thus giving a good exposure of the perineum. In all of our cases but two, the drainage was instituted for diffuse peritonitis resulting from appendicitis, and the primary incision was made at the site ordinarily employed, but carried down toward Poupart's ligament slightly farther than is usually done. This was in order that less difficulty might be experienced in carrying the index and middle fingers of the left hand down to the pelvic floor so as to here recognize the normal structures which are to be guarded against injury. With a scalpel in the right hand, the tuberosity of the ischium on the right side is sought for, and a stab wound is made through the perineal structures one-half inch internally to the tuberosity, so as to avoid wounding the internal pudic artery. The knife is pushed forward to open through Colles' fascia, the anterior and posterior layers of the triangular ligament, and the levator ani muscle. After this the knife is withdrawn, and a pair of dressing forceps is introduced and pushed on through the peritoneum against the two fingers of the left hand so placed as to indicate the site where the perforation should take place. The forceps is then continued through the pelvic cavity, grasping and carrying down through the drainage tube to be employed. The drainage tube we have generally used is one-third inch in diameter with somewhat rigid walls, in order to prevent its collapse through pressure from the surrounding tissues.

We have always employed, in conjunction with this drainage, drainage through the primary opening, as well as of the subrenal pouches where these have been involved. For the first twenty-four to thirty-six hours the cavity has been flushed every three or four hours with a pint or more of normal salt solution of a temperature of 105° F. In two cases continuous irrigation was employed; in one for seven, and in the other for twelve hours. We are not prepared to say that this is possessed of any special advantage, yet to us it has seemed so. In flushing the pelvic cavity only a minimum degree of pressure is employed, as, for example, that which would be represented by the reservoir being elevated

about a foot above the pelvis, it being desired not to force such barriers against escape of liquid from the pelvis, as may have resulted from adhesions of the intestines and omentum. Gravity as an aid to drainage has also been utilized by ample elevation of the head of the bed, as well as by permitting the patient to lie upon his right side. The drainage tubes are permitted to remain until the discharge has practically ceased, after which they are removed, and a silkworm-gut drain is introduced.

The total number of cases thus treated by us is nineteen, in all of which there existed diffuse pelvic peritonitis with accumulations of purulent fluid often elevating the distended bowel high into the abdomen, and in two cases ascending between the mesentery and descending colon and overflowing from the pelvis into the left subrenal fossa, which was also opened and drained. In all but five cases free pus existed in the space to the outer side of the ascending colon, which, in each instance, was drained through the ileo-costal space. In one case the distended paretic bowel necessitated opening and the establishment of an artificial anus.

Three of the cases thus treated have died. One died after an illness of nearly five months, during which time death was threatened on three or four occasions by intestinal obstruction, while a number of abscesses appeared in the abdominal wall. Death resulted from exhaustion incident to the prolonged suppuration. In the second fatal case, death took place ten days after the operation, and was due to toxemia. In this case there occurred the first and only untoward result from the procedure that has been observed by us, and I believe it to have been directly responsible for the unfavorable termination, for until its appearance the man was progressing most favorably to recovery, although he was nearly moribund at the time of the operation. On the fifth day, and until his death, there appeared urine in the discharge. We remain in ignorance as to whether its source was from the ureter or the bladder, for no post-mortem examination was secured. We must, however, incline to the view that its source was the ureter rather than the bladder, for there was no pus in the urine voided by the urethra. That it was due to pressure necrosis, rather than to direct wounding of the part at the time of operation, seems most reasonable in view of the fact that it made its appearance so late after the operation. The third case died six hours after the operation.

The cases operated upon have varied in age from seven to fifty-two years. We have had no cases wherein there existed an enlargement of the prostate, which, if of marked degree, would render the procedure difficult, if not impossible.

We have noted what has seemed to us a marked tendency to the development of symptoms indicative of intestinal obstruction, following the operation anywhere from one week to two months. It appeared in six of the cases, and was interpreted by us as due to adhesions interfering with intestinal peristalsis. In the management of this condition we have found that distention of the bowel with air at intervals, as indicated, has served us best in bringing about relief.

In conclusion, we would say that perineal drainage, as here outlined, has seemed to us to have given better results than we had previously secured in this class of our cases without its employment. To what extent it has contributed, if at all, to the recovery of the cases in which we have used it, we are not in a position to say, for in none of our cases was this method relied upon to the exclusion of other drains; it was utilized in conjunction with anterior and ileo-costal drainage. We well realize that the number of cases here reported is not sufficient to base an opinion that can be of much value, especially as there exist no means by which we can measure the varying degrees of gravity of these cases and no terms in which it can be expressed. The cases here reported represent all of the cases, except one, that have come under our care during the time since we first employed this procedure, and in that case this method as an adjunct was overlooked.

A more extensive experience with the method may prove it to be useless and even possessed of dangers that we fail to realize at this time. We have presented here the results of our experiences with this method, less for the purpose of influencing any of our readers to an adoption of the plan, than to submit it to their critical consideration of its faults.

CHOICE OF CLIMATE IN SURGICAL TUBERCULOSIS.

For tuberculosis of the bones and joints and scrofulous affections of childhood the seacoast climate in our temperate zones comes nearer to deserving the term *specific* than anything else. The peculiarly beneficial influence of seacoast climate in bone and joint tuberculosis is doubtlessly to be ascribed to the aseptic and ozonic quality of the air, and the iodids and other salts suspended therein. But pure air and outdoor life, in whatever locality, can and should be utilized in the treatment of tuberculosis and scrofulous affections of childhood.—S. A. KNOPF, in the *New York Medical Journal.*

FRACTURE OF THE BASE OF THE FIFTH METATARSAL BONE BY INDIRECT VIOLENCE; WITH REPORT OF CASES.

By WALTER M. BRICKNER, M.D.,
Chief of Surgical Department, Mount Sinai Hospital Dispensary; Surgeon to the Rockaway Park Sanitarium for Children,
NEW YORK.

Editorially in this journal[1], in connection with the discussion of the frequency of fractures of the foot by moderate violence and of the special value of the x-rays in foot injuries, the writer has referred to the occurrence of a lesion probably seldom differentiated from a "sprain"—fracture of the base of the fifth metatarsal by indirect violence, first described by Robert Jones, of Liverpool[2].

By means of a skiagraph, Jones discovered, in his own person, a fracture of the base of the fifth metatarsal, produced by bearing his weight on the inverted foot while dancing, his heel, at the moment, being off the ground. Within a short period thereafter Jones observed three similar cases and secured records of two more. (He reported with these a sixth case of the same fracture produced, however, by direct violence.)

In the following year F. J. Cotton and C. P. Sylvester[3], reported a case likewise occurring while dancing, from the same violence (the fracture, however, an *oblique* one of the shaft of the bone); and Cotton has recently published five more.[4]

In addition to at least one case bearing the clinical evidences of this fracture, in which, however, no x-ray examination was made, the writer has observed the two following:

CASE I. Boy, aged 12. Seen in 1903 in the department of Dr. W. H. Luckett, at the Mount Sinai Hospital Dispensary. The day preceding, he had twisted his left foot (inward?), while walking. He felt a sharp pain in the foot but continued to walk. He had no symptoms other than pain on walking. Swelling of the outer side of the foot and marked tenderness at the base of the fifth metatarsal suggested the diagnosis of fracture at that site, which was confirmed by a skiagraph. (Figure I.) Treatment consisted in adhesive plaster strapping and a firm bandage, in which the patient walked with fair comfort.

CASE II. Mrs. J. W., aged 50. On May 31, 1906, while standing at the edge of the pavement surrounding, and raised a few inches above, a clearing of dirt about a tree, her left foot turned inward, over the edge of the pavement. For twenty-four hours thereafter she had much pain and the foot was considerably swollen. Regarding the condition as a sprained ankle she bandaged the member and walked about on it. The pain continuing, however, a week after the accident, she came to my office on June 6th. At that time she limped slightly. There was some ecchymosis and slight edema over the outer border of the foot. At the base of the fifth metatarsal bone, but in front of its posterior projection (tubercle), there was distinct localized tenderness. By careful examination crepitus could also be elicited—a sign usually absent in these cases. The skiagraph (Figure II), showed a fracture at a level a trifle posterior to that in Case I.

A light plaster-of-Paris cast was applied for two weeks, and thereafter a small molded plaster splint was kept over the outer edge of the foot, by a bandage, for another week. During that time the patient walked with crutches, keeping the sole of the left foot from the ground.

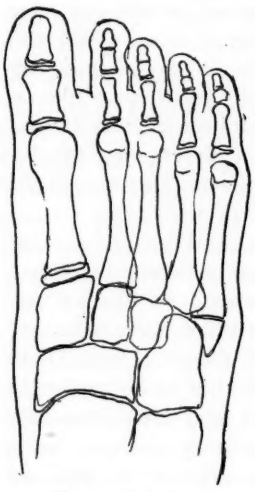


Fig. 1. Case I.
Tracing from x-ray print.

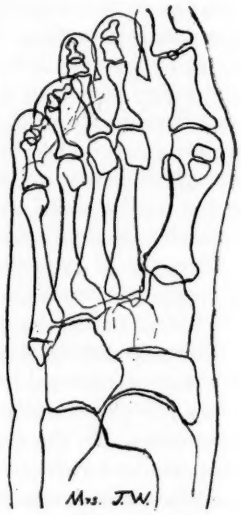


Fig. 2. Case II.
Tracing from x-ray negative.

While clinically, and probably also etiologically, these fractures of the base of the fifth metatarsal bone are identical, anatomically they vary within a fairly wide range. Thus, some occur across the widest portion of the base of the bone (as in Case I); some occur a little posterior to this level, *i. e.*, through the tubercular eminence (as in Case II); some are in front of, but usually close to, the base; and two reported by Cotton were distinctly in the shaft of the bone, near the middle. In all of the cases, however, the fracture was directly transverse, with the exception of the case of Cotton and Sylvester, above referred to, which, with the other case of fracture through the shaft, does not strictly belong, anatomically, to this group of cases as described originally.

Jones thus describes the mechanism of the fracture: "The prominent base of the fifth metatarsal is closely bound to the cuboid and to the fourth

[1] *American Journal of Surgery*, February, 1906.
[2] *Annals of Surgery*, June, 1902, p. 697.
[3] *Boston Medical and Surgical Journal*, 1903, Vol. 149, p. 735.
[4] *Boston Medical and Surgical Journal*, 1906, Vol. 155, p. 229.

metatarsal by strong ligaments on every side. [?] So powerful are these ligaments that dislocation of the base is the rarest of accidents. It is obviously easier to break the bone than to dislocate it. When the heel, therefore, is off the ground, the body weight expends itself upon the fifth metatarsal, rotating it slightly inward. The opposition to this force takes place at its base, where the strongly attached ligaments resist its displacement. A fracture occurs, therefore, exactly where one would expect it to occur . . . ."

Whether or not this explanation is entirely correct, the prominence of the base of the bone, the projection of its tubercular eminence, and the relative lack of protection, no doubt are essential factors. Perhaps sudden tension on the tendon of the peroneus brevis, which is attached to the base of the fifth metatarsal, also plays a rôle.

Whatever the exact mechanism, it would appear that the weight of the body upon the outer edge of the inverted foot (when the heel is off the ground —Jones) is the productive violence.

The diagnosis is not difficult. Of the physical signs, which deserve first mention, localized tenderness at the base of the bone is the essential one. Pain referred to the base when pressure *inward* is made on the distal end of the bone, is also described by Cotton. Swelling over the outer side of the foot, most marked over the lesion, is probably always found. Ecchymosis may also be present. Crepitus is reported in but two of the cases. (One of Cotton's and one of the writer's.)

Of the subjective symptoms, spontaneous pain may be absent at the time of examination; when present, it is variable in degree, and is not always referred entirely to the site of the lesion. Pain on walking is present, but is probably seldom very severe. It also is not always localized to the outer side of the foot.

When the patient can describe the manner of the injury, such a form of violence as described by Jones is confirmatory evidence.

Lastly, skiagraphy, which is to be advised in all cases of injury to the foot in which the occurrence of a fracture cannot be satisfactorily excluded by careful palpation, will determine the lesion. In these cases of fracture of the base of the fifth metatarsal, however, "all the lines of fractures cannot be traced quite through the bone [in the skiagrams] but there can be but little doubt that the fracture is complete." (Jones.)

The management of the lesion is simple and obvious. Recovery is complete. Probably its treatment as a sprain is no more serious an error than is involved in failure to hasten the relief of pain and disability.

THE ROENTGEN RAY TREATMENT OF MALIGNANT DISEASE OF THE BLADDER THROUGH A SUPRAPUBIC INCISION. REPORT OF A CASE.*

BY A. L. GRAY, M.D.,

RICHMOND, VA.

In none of the literature at my command have I seen reported at any time favorable results from the Roentgen ray treatment of malignant disease of the bladder.

This disease is certainly of sufficiently frequent occurrence to justify the belief that x-ray therapy must have been tried in many cases where the growth was easily accessible, before the involvement became so extensive as to render these cases hopeless.

The now well-known fact that the curative effect of the light is diminished to a very great extent in its passage through the superficial tissues, and the inability to apply this agent in these cases without the most efficient rays being filtered out before they reach the diseased area, must be responsible for the lack of more favorable results.

The problem of a tube of such shape and size as to admit of its introduction into the bladder *per urethram,* and the generation of the light within that organ, is one that has not been satisfactorily solved and seems, especially in the male, to offer insuperable difficulties. Cystoscopy has been recently perfected to such an extent that intravesical growths may now be readily discovered on the first appearance of significant symptoms, and we may hope that the factor of extensive perivesical tissue involvement when the patient is referred to us, may be to a great degree eliminated.

It seems to be the general experience of all Roentgen ray operators that the only cases in which we can, with any degree of certainty, predict a cure, are those involving the skin and accessible mucous membranes, and doubtless the theory that the efficient rays are filtered out is the correct explanation. If the vesical mucous membrane be rendered accessible, we should naturally expect results similar to the treatment of like growths elsewhere.

However early a malignant tumor of the bladder

* Read before the American Roentgen Society, at Niagara Falls, August, 1906.

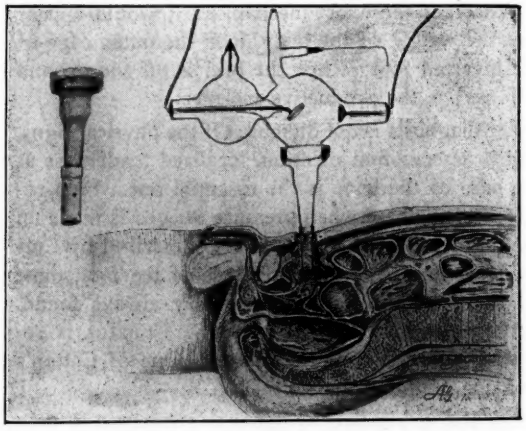
be discovered, save at its very incipiency, surgical procedures cannot be expected to permanently eradicate the growth without the removal of so large a portion of the bladder wall that the patient, if he survive, must "eke out a miserable existence." It is especially desirable, therefore, that we devise some means whereby the tumor may be removed by the Roentgen rays.

The case which suggests this paper is as follows:

W., male, white, æt. 67, clergyman. The patient's trouble began in 1901 with dribbling after urination, which was the only evidence of disease at that time. Later the urine became muddy, with a visible amount of blood present. This condition continued, and while there was only slight discomfort, not amounting to marked pain, he was beginning to be troubled with too frequent urination, and consulted a specialist whose findings led to a diagnosis of cystitis and prostatitis. Since 1904 he had had several severe attacks of acute pain and tenesmus attended with the passage of dirty urine loaded with bloody pus, each attack lasting from one to two weeks and gradually subsiding.

November 1, 1905, the patient presented himself to Dr. R. C. Bryan for treatment. He had been for some time wearing a rubber urinal on account of the almost constant dribbling. Catheterization had never been necessary. Examination of the urine at this time confirmed the earlier diagnosis. A No. 27 F. sound passed easily. Rectal examination, however, showed the prostate gland firm, free from tenderness, the right side very slightly larger than the left. Repeated attempts at cystoscopic examination were unsuccessful on account of the hemorrhage present, though at different times silver nitrate and adrenalin irrigations were used, On account of persistent and alarming hematuria, suprapubic cystotomy was advised and the operation was performed January 5, 1906—five years after the appearance of the first symptoms. A tumor was found "the size of a ten-year-old child's closed fist, attached by a pedicle the size of the wrist of a child the same age." The growth was removed by severing the pedicle at its junction with the tumor, and the stump was left attached to the floor of the bladder. On account of profuse hemorrhage the entire bladder was packed with gauze. On microscopic examination the specimen proved to be squamous cell carcinoma.

One week after the operation x-ray treatment was begun. The tube used was Piffard's protecting tube with the smaller sleeve attached. In order to administer the light directly upon the growth, a large, somewhat stiff, soft rubber drainage tube was cut just long enough to reach to the growth and admit of the projecting end being slipped over the free end of the sleeve. By this device, the patient being in the dorsal position, the suprapubic wound was effectively and painlessly held patent. Fenestræ were made in the rubber tube to prevent the urine from rising within it and a wick of gauze, placed alongside the tube in the incision, drained off the urine as fast as it accumulated. While the diameter of the rubber tube was less than that of the stump to be treated, it was estimated that as the growth should shrink under the influence of the light, gradually more of its surface would come within the field and, therefore, should the treatment prove beneficial, ultimately the entire stump would have been exposed to the light. Treatments of ten minutes each were given every other day. Once a week the finger was introduced to ascertain the existing condition. Each



examination showed a gradual improvement; and finally there was noted the complete disappearance of the entire pedicle after twenty-one treatments, leaving behind a soft linear cicatrix.

The patient left for his home March 16, 1906. The suprapubic wound closed about six weeks thereafter. He has remained free from any evidence of recurrence and is now actively engaged in his profession.

In the treatment of this case strict asepsis was observed, though perhaps in the majority of such cases, as was present here, more or less cystitis exists when they first come under observation.

While the situation of the tumor in this particular case seems especially favorable to this method of treatment, from the fact that the bladder is in a collapsed condition so long as the suprapubic wound is not closed, almost any point on the bladder wall may be brought within the path of the light. The incision was prevented from closing by the presence of a tube

somewhat larger than the one attached to the sleeve of the x-ray tube, which also served for siphoning off the urine.

The happy results in this case seemed to justify the operation of suprapubic cystotomy at the earliest moment after a diagnosis of tumor of the bladder has been made, the removal of as much of the growth as can be done without serious injury to the bladder; and, if malignancy be found, x-ray treatment should be begun as soon as the condition of the wound is such as to allow the tube to be introduced without producing too great pain or hemorrhage.

It is not at all improbable that urine may become itself radioactive as a result of irradiation and exert an additional curative influence, lasting, it may be, longer than the duration of the exposure.

Nothing short of clinical observation, however, can determine this until the peculiar character of radiant energy which produces the physiologic effect, be ascertained.

RUPTURE OF BOTH KIDNEYS WITH INTRAPERITONEAL HEMORRHAGE; REMOVAL OF ALL OF LEFT KIDNEY AND PART OF RIGHT KIDNEY; RECOVERY.

By A. LEO FRANKLIN M.D.,

CUMBERLAND, MD.

Formerly Assistant Resident Surgeon at the University Hospital, Baltimore, Md.; Lecturer on Surgery, Western Maryland Hospital; Visiting Surgeon, Western Maryland and Allegheny Hospitals.

On March 2, 1906, Bessie H., aged 16, weight 115, while playing, fell from a railroad car, a distance of about four feet, landing on her abdomen across the rail. She was considerably stunned, but arose in a few minutes and complained to her companion that she "had torn something loose on the inside." She experienced some pain, but not sufficient to prevent her from walking home, a distance of about one-fourth of a mile. Soon after arriving home the pain increased in severity. I saw the patient about one hour after the accident and found her severely shocked, very restless, and suffering with colicky abdominal pains. Her temperature was 98°; pulse 127, irregular, weak and compressible; skin cold, pallid and covered with perspiration; pupils dilated and reacted but slowly to light. She vomited several times, the vomitus being of a green color. The abdomen was distended, the right rectus muscle rigid. There was tenderness over the kidney region, dulness on the right side and especially in the right iliac fossa (the patient was lying slightly on the right side). Catheterization withdrew two ounces of very bloody urine. I applied an ice-bag over the right kidney, surrounded the patient with hot bottles, elevated the foot of the bed and administered adrenalin chlorid (1-1000) gtts. x, ergotole 5ss, hypodermatically, several times during the night. Morphin was required for pain and restlessness.

I regarded the case as one of intraperitoneal rupture of the right kidney and advised an immediate operation. Both parents and patient objected. The patient did poorly, the symptoms increasing in intensity, and Dr. J. K. Cole was called in consultation. He agreed with my diagnosis. Together we persuaded the patient to go to the Allegheny Hospital.

Eighteen hours after the accident narcosis was begun, chloroform being selected. The patient stood it well for the first hour, but did poorly towards the end, due to the great loss of blood during the operation.

Operation. I made the incision in the median line and found a large quantity of blood and urine in the peritoneal cavity. This was cleaned out and flushed with normal salt solution. I found the right kidney low down in the abdomen, lying directly in front and over the third and fourth lumbar vertebræ. It exhibited three transverse rents and was tied at its lower pole to the left kidney by a dense fibrous band, a half inch in diameter (horseshoe kidney?). The left organ I found literally torn into fragments, entirely without its capsule, and separated from the ureter. I ligated the vessels and removed all the pieces of the left kidney, and a portion of the right, which had been mashed into a pulp. The remaining parts of the right kidney (not more than two-fifths of the original kidney substance), were in a very bad condition, and showed two rents. It was packed with gauze. The abdomen was filled with normal saline solution after repeated flushings, then closed with through and through silkworm-gut sutures, and drained.

Adrenalin and ergotole were continued, hypodermatically, and intravenous saline infusions were administered. The patient was catheterized six hours after the operation, and an ounce and a half of blood and urine were found. From the time the reaction set in, ten hours after operation, the patient did well. The gauze was removed on the sixth day. This was followed by a urinary sinus through which most of the urine passed for the next five days. It closed on the sixteenth day. The patient sat up on the thirteenth day after operation, and left the hospital on the twenty-third. She has enjoyed good health ever since (now more than six months), and passes a normal amount of urine.

American Journal of Surgery

PUBLISHED BY THE

SURGERY PUBLISHING CO.

J. MacDONALD, Jr., M.D., President and Treasurer.

92 William Street, N. Y., U. S. A.

To whom all communications intended for the Editor, original articles, books for review, exchanges, business letters and subscriptions should be addressed.

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, OCTOBER, 1906.

SIR VICTOR HORSLEY'S ADDRESS ON OPERATIONS ON THE CENTRAL NERVOUS SYSTEM.

To trace the development and final results of the labors of a pioneer in a certain branch of medicine is one of the most interesting and fruitful fields of study. This is why the Surgical Address of Sir Victor Horsley, before the British Medical Association at Toronto, was looked forward to with more than the usual interest. That it fulfilled all expectations and was, perhaps, the leading feature of the recent meeting is now a matter of history.

The past two decades have seen many contributions to the subject of brain and spinal cord surgery, the product of Horsley's rich experience in this special field. His recent address is a summary of this experience so far as it concerns the fundamental principles and general technics of surgical attacks upon the central nervous system. What constitutes Horsley's eminence is no less his accuracy in neurological diagnosis than his brilliancy in the mechanical side of his art. It is this combination of authoritative neurologist and authoritative surgeon—the sort of combination that will have to become more common as the surgical specialties develop—that makes him "master."

Neither those who have an active interest in the subject itself, nor those who enjoy the study of epochal contributions to the literature of medicine will content themselves with a mere abstract of an address so important and so absorbing. A brief summary of the chief statements it contains is offered, therefore, less as a digest than as a matter of recognition.

Horsley speaks highly of palliative brain surgery in order to relieve optic neuritis, severe headaches and vomiting. In his experience he has found it necessary not merely to open the skull in order to relieve intracerebral tension, but also to make a free opening in the dura mater. He has also found that in his cases, the optic neuritis began as a rule on the side of the lesion. This is sometimes of importance for its localizing value. Inasmuch as motor functions cannot be restored if the cortical representation is removed, Horsley makes the general observation that when operating on the cerebrum as little injury should be done as possible. In operations for cerebellar tumors he has never found it necessary, as some surgeons have advocated, to remove a lobe or a portion thereof, in order to gain access to the tumor.

As regards anesthesia, chloroform should *always* be used. He advocates, however, the apparatus of Harcourt for its administration; by this means the vapor percentage can be readily estimated and accurately regulated according to the stage of operation.

It is highly important that the temperature of the operating room shall not be less than 75° F., and that the area of operation shall be constantly irrigated by a solution of bichlorid of mercury, 1-10,000, at a constant temperature of 115° F. The latter not only diminishes the tendency to shock, but is an active influence in controlling capillary and arterial hemorrhage.

The subject of hemorrhage is discussed somewhat in detail. As a general rule, vessels should be tied and divided as far as possible from the trunk, in order that the softening that may follow shall be as small in area as possible. Horsley does not approve of preliminary ligation of the carotid. Inasmuch as the arteries of the brain pass from below upwards, it is better to begin the excision below. Bleeding from arterioles and capillaries, however, can be easily controlled by the hot irrigation referred to above. Bleeding from venous sinuses can be nicely controlled by the use of wax or ligature. In some cases of capillary hemorrhage, especially at the base of the skull, Horsley has found that the simple procedure of inhalation of oxygen is sufficient to control it.

In the main, Horsley agrees with the conclusions of Crile on the subject of surgical shock. In a good many cases shock may be obviated by performing the operation in two stages, a method suggested by Horsley as long ago as 1893. A faulty method of

opening the skull contributes to shock. The bone should be divided as little as possible by vertically applied force. Horsley prefers to first trephine and then cut away the bone with a large forceps. He quotes statistics to show that shock is nearly three times as great in operations on the cerebellum as on the motor area of the cerebrum. In the treatment of shock, inhalations of oxygen, nutrient enemata containing beef tea or pancreatized milk, and strychnin are to be employed. The limbs should be surrounded with cotton wool, and the patient must be kept warm.

Concerning sepsis, as little drainage should be employed as possible, inasmuch as the largest percentage of septic complications occur in the course of the subsequent dressings. The great fear of many surgeons concerning the lateral ventricles, Horsley does not believe is justified. Only one precaution need be taken, namely, to prevent the flow of blood into these cavities.

Fifty-five cases of removal of tumors of the brain are reported. Of twenty-three cases of glioma and sarcoma, only three are free at the end of three years. Of eight cases of endothelioma, seven are alive and well. Of twenty-seven non-malignant tumors, comprising such lesions as tuberculosis, gumma, fibroma, cysts and adenoma, all but three are cured. In this connection the author reports the interesting observation that in three cases of glioma which could not be removed radically, retrogression occurred after operation and ultimate recovery ensued.

CONSERVATIVE GYNECOLOGICAL OPERATIONS.

At the last meeting of the American Gynecological Society the results obtained from the so-called conservative operation upon the uterine appendages was the subject of discussion. Although at least one of the papers was statistical, the majority of the speakers contented themselves with the presentation of their views, gained in most instances from extended experience. The consensus of opinion favors conservative operation within reasonable limits.

The value of conservative or radical technic will always depend upon the accuracy of the pathological diagnosis, which should apply as well to diagnosis before, as during operation. Countless operations are undertaken these days by non-specialists, by men who control operative technic to a sufficient degree to render the laparotomy itself devoid of excessive danger, but who have either not seen enough, or not reflected sufficiently to enable them to select cases properly or, during the course of the operation, to decide upon the correct measures to be adopted. As long as a slightly reddened or adherent tube, an ovary containing a few cysts, or even an ovary enlarged by the presence of a corpus luteum can be shown with impunity to the visitors in the operating room, or to the waiting relatives, as a pathological specimen, these operators will continue their reckless work. Needless to say the patient is not benefited, and the pains, which may be due to other causes, such as floating kidney, dysmenorrhea, etc., are not relieved; but "the operation is successful."

Another class of operators considers acute or subacute pelvic inflammation of short duration a sufficient excuse to open the abdomen. The patient submits to operation because she is assured that the pains and disability will otherwise persist and will increase rather than decrease in intensity, the surgeon determining to do merely "a conservative operation." When pelvic viscera matted together are now encountered, it proves difficult for the most expert to decide what to take away and what to leave—the natural consequence is that usually the cervix, and sometimes part of an ovary are all that remain of the internal generative organs when the abdomen is closed. In these instances a few weeks or months of patience on the part of both the surgeon and the patient would readily determine whether the process could not disappear without operative treatment, or, if operation were then undertaken, more favorable conditions for judicious selection would be had.

Finally, there remains a small number of cases, which are those more especially referred to under the caption discussed at the society meeting, where conservative and reconstructive measures really should be undertaken. The patients to whom we refer are young women, who have never borne children, and women who are anxious to increase their family, even at the cost of additional risk and the danger of reoperation at a later date. If, upon opening the abdominal cavity, ovaries buried in adhesions, stenosed or inflamed tubes, moderately cystic ovaries, small fibroids, etc., are resected, trimmed or otherwise conservatively treated, in the hope that fertilization may occur, such halfway measures should be regarded as fully justified. It is true that in a number of instances the expectation of neither operator nor patient is fulfilled, sterility persisting, or, which is even more important, the pain and disability which primarily occasioned the operation return in full force. Some cases, however, prove eminently successful because not only does pregnancy occur, but the patient is restored to health.

R. T. F.

Surgical Suggestions.

Bronchiectasis is not seldom complicated by brain abscess.

In an attack of cholelithiasis the vomiting as a rule is not attended by relief of pain; the contrary is true in ulcer of the stomach.

In differentiating between gastric ulcer and gall-stone pains, the association of a chill usually points to cholelithiasis.

If an undoubted case of ulcer of the stomach is associated with chills, in most cases it means that the ulcer is adherent to the spleen.

Long pauses between attacks of gastric or abdominal pain speak in favor of cholelithiasis.

If pressure in the right hypogastrium gives rise to a referred pain in the shoulder region, the offending area is probably the gall-bladder and not the pylorus.

Tuberculosis and cholelithiasis are only very rarely associated.

In catarrhal icterus the pulse is usually slow; in jaundice from cholelithiasis this is usually not the case.

If a patient vomits coffee-ground material in which no lactic acid is present, one can almost always exclude carcinoma.

A sudden desire for sharp, sour and spicy articles of food in a middle-aged or elderly person is often the first symptom of a beginning gastric carcinoma.

In persons of middle age presenting gastric symptoms, the diagnosis of cancer should not be excluded because the symptoms have had a sudden onset. Such an onset occurs in a fair proportion of cases.

The admixture of adrenalin to cocain solution counteracts much of the depressant effect of the anesthetic and enhances the local vaso-constriction. When the mixture is used on the surface of a mucous membrane, however, as in excising an ulcer in the mouth, one must be prepared for a marked reactionary bleeding.

One of the most important elements in the treatment after intestinal operations is the administration of opium or morphin in large doses for the purpose of "splinting" the peritoneum.

A bichlorid of mercury dressing should never be applied on an area of skin on which tincture of iodin has been recently painted. An iodid of mercury is formed, which is highly irritating.

In operations for suture of a fractured patella it is very important to sew the torn lateral ligaments of the joint. These aid largely in the support of the joint.

That a bone appears normal by fluoroscopic examination does not gainsay the presence of a fracture. A fracture of the radius, for example, may occur without displacement of the fragments. An x-ray plate will demonstrate the line of fracture, when the fluoroscope fails to.

Nitrate of silver may be attached in full strength to the end of a probe, as for application in the middle ear, by heating the tip of the instrument and pressing it into the stick of caustic; a little of the latter will melt and form a bead on the probe when it cools.

If a patient gives a history of "sprained wrist" that has remained feeble and painful in spite of appropriate treatment for sufficient time, and if the wrist presents thickening and tenderness at its radial aspect, a diagnosis of fracture of the scaphoid should be entertained. Colles' fracture must be excluded, by the relation of the two styloid processes and the location of the deformity. Fractures of the radius and scaphoid may, however, coexist.

A convenient way in which the anethesist may carry, all sterilized and ready for instant use, his hypodermatic solutions, is the following. Shallow, wide-mouthed, half-ounce bottles are sterilized, labeled and filled. Over the mouth of each bottle is then stretched, and hermetically fastened, a cover of sterilized rubber (dam). Before the narcosis is begun the anesthetist disinfects his syringe and sets these bottles in a dish of sublimate solution. This sterilizes the surface of the rubber. When a solution is wanted the needle of the hypodermatic syringe is simply thrust through the rubber and as much as is needed is drawn into the barrel. The puncture hole closes without leakage. The covers of the bottles need to be changed only occasionally.

Progress in Surgery.

A Résumé of Recent Literature.

A Serum Having Therapeutic Value in the Treatment of Exophthalmic Goiter. S. P. BEEBE, New York. *Journal of American Medical Association*, September 1, 1906.

This article relates the progress made by Beebe in his experiments for the production of a therapeutic serum for exophthalmic goiter since his former paper was published. From these later experiments he says that it may be safely concluded that a serum having a high degree of specificity can be prepared by injecting the purified nucleoproteids of a given organ into some animal of alien species. They also prove that absolute specificity cannot be attained by this method, and he believes by no other. At the time of his first report, Dr. Rogers and he had used only the serum obtained from the thyroids of fatal cases of exophthalmic goiter. Since then they have experimented with the serum derived from normal human glands obtained at autopsy, and the method of their preparation and the obtaining the serum are detailed at length. Three species of animals, rabbits, sheep and dogs, have been used for developing the serum, chiefly large buck Belgian hares which were found to give the best serum. For some reason, dogs were found to be not well adapted for this purpose. Experiments having shown that the agglutinating power of the serum is in a remarkable degree parallel with the local and constitutional reaction produced, a means of comparative standardization is afforded. As regards any hemolytic action of the serum, Beebe thinks it improbable with the therapeutic dose used, though he admits that it is possible that it may be greater in the living body than *in vitro*. Clinically he has observed that the serum treatment causes an increase in the percentage of hemoglobin and the number of erythrocytes, possibly due to the general health improvement and not to any direct action on the blood-forming organs. The therapeutic use of the serum is based on the theory that exophthalmic goiter is a toxemia and that the toxin in question is the thyroglobulin. This theory best explains the striking results obtained in some acute cases with soft thyroids, probably in a state of simple hypertrophy and containing a large amount of colloid matter with but a slight increase in the number of cells. The majority of cases, however, are of the chronic type, and do not show at once this rapid improvement. The gland is more cellular and the cytotoxic element in the serum, in the small doses given, is probably too feeble to cause immediate or rapid diminution of the gland. More rapid destruction, moreover, might be dangerous in these cases. There is some reason to think that the serum does have a cytolytic effect; the main fact is that there is a reduction in the size of the gland, and in a few cases it has been restored to apparently normal size. There is an advantage in having two sources of the serum; in some cases treated at first effectually with sheep serum for a considerable period, it became ineffective to control the exacerbations that then occurred, but these were promptly controlled by the use of the serum from rabbits. It would seem that here the long continued use had developed in the patient an anti-antitoxin, and he was thus made largely immune. The immunity, however, evidently did not extend to the biologically different antitoxin. In cases requiring long continued treatment, an occasional change in the biologic character of the serum may be required. Beebe does not find from his investigations and the therapeutic tests that there is any radical difference between the normal and pathologic serums. More study and testing, however, are yet required positively to settle the question, which is an extremely complex one. If the hypothesis regarding the antitoxic and cytotoxic properties and their dependence on the injection of thyroglobulin and nucleoproteid respectively, is correct, it will be advisable to vary the activity of the serum in respect to these two factors to meet the indications in different cases. Experiments are being made as to this question, but no statement of results can as yet be given. Considering all the facts, Beebe thinks it fair to conclude that the serum has considerable value in the medical treatment of exophthalmic goiter. The improvements and cures under its use have been too numerous to be ascribed to coincidence, and he believes that under favorable conditions much can be accomplished by careful serum therapy.

[At the recent meeting of the British Medical Association at Toronto, Pearce stated that he was unable to confirm the serum reactions described by Beebe. According to Pearce, he was unable to obtain an antibody by injecting pure nucleoproteid. Although these later experiments will oblige Beebe to find a different explanation for the action of his serum, it by no means proves that the serum is ineffective in the treatment of goiter.]

On the Technic and Results in the Excision of Cancer of the Head and Neck. GEORGE CRILE, Cleveland. *Pennsylvania Medical Journal*, September, 1906.

In a careful study of 4,500 cases of cancer of the head and neck, Crile found that metastases occurred in only 28, or less than one per cent. This is due to the extensive lymphatic supply which acts as a strong barrier against dissemination. This fact affords, therefore, an excellent argument in favor of radical operation. The technic is studied from three viewpoints: infection, hemorrhage, shock and collapse. The greatest infection risk, especially in operations on the tongue, trachea and larynx, is that of broncho-pneumonia. This may be obviated by either tracheotomy, performance of the operation in two stages, or, and this the author regards as the best method, by packing the pharynx with gauze after inserting long rubber tubes through which the anesthetic may be given. In order to control hemorrhage, Crile advises temporary ligature of the common or external carotid. This he has done in 61 cases without untoward results. Venous hemorrhage may be minimized by placing the patient in a partially upright posture, or by enclosing him in the author's pneumatic suit. Shock and collapse may be minimized by reducing unnecessary manipulation, by combating all hemorrhage, and by rapidity of operation. The principle causes of collapse are interference with the trunk and certain terminals of the vagus, excessive hemorrhage, air emboli, and anesthetic accidents. Crile advises a preliminary injection of morphin with atropin in every case. In laryngectomy the superior laryngeal nerves should be early exposed and divided in order to stop reflexes and abolish pain. The dissection in tumors of the neck should be what the author calls the "block" variety, similar to that of the Halsted operation for tumors of the breast. Of 36 cases performed by Crile by means of the "block" dissection, 12 have passed the three year limit.

Paraffin Injections and Implantations for Nasal and Face Plastics (*Paraffininjectionen und Implantationen bei Nasen und Gesichtsplastic*). H. ECKSTEIN, Berlin. *Berliner Klinische Wochenschrift*, July 30, 1906.

Contrary to the experiences of many, Eckstein uses instead of vaselin, paraffin of a high melting point. Instead, however, of injecting the material, he implants the paraffin through a separate incision a short distance away from the site. The lump of paraffin is first cut and moulded to the desired shape and size, or it may be implanted layer by layer. Eckstein has devised one or two special instruments by which the implantation may be done easily and with accuracy. The special advantages that the author claims for this are mainly two: 1. Elimination of any possibility of thrombosis. 2. Greater accuracy and applicability. He passes lightly over such disadvantages as the increased magnitude of the operation and the presence of a scar. The latter, he claims, becomes invisible after a while. The author discusses in detail the fields of applicability and claims his method has a wider range than the injection method.

Preparation of Silver-Gutta-Percha Silk (*Herstellung der Silberkautschukseide*). WEDERHAKE, Bonn. *Zentralblatt für Chirurgie*, No. 35, 1906.

1. The silk is rolled up on glass plates or spools, and is freed from fat by immersing first in ether, then in absolute alcohol for 12 hours in each.
2. Transferred to 10% hydrogen peroxid solution for 20 minutes.
3. The silk is now placed for one hour in the silver solution. This solution is prepared as follows: To 30 c.cm. of a 1% silver nitrate solution is added, drop by drop, a potassium hydrate solution (G. P.) until no further blackish-brown precipitate occurs. Usually 10 drops suffice. Constantly shaking, ammonia is added, drop by drop, until the precipitate is completely redissolved and the fluid is again perfectly clear. After one hour's immersion, the silk should be black and have a metallic lustre. To prove that the impregnation has been complete samples of the silk are cut across and examined.
4. The silver silk is dried at 100° C.
5. Transferred to pure chloroform for two hours.
6. Finally, the silk is placed for 12 hours in a chloroform-caoutchouc solution (8 gm. black caoutchouc, 50 c.cm. chloroform).
7. The silk is now rapidly washed in chloroform, dried, and then boiled for 10 minutes in a 1% sublimate solution, in which it is permanently kept. Linen thread may be used instead of silk. Simple silver silk is prepared by placing the silk for 1 hour in 10% peroxid of hydrogen solution, then transferring for 1-2 hours, depending upon the thickness, to the silver solution, finally boiling for 10 minutes in 1% sublimate.

The silver-gutta-percha silk is antiseptic, does not imbibe fluids, the preparation increases the tensile strength by fully one-third, and the method of preparation is simple [?] and inexpensive. This suture material unites the good qualities of both silk and silver wire, avoiding at the same time their disadvantages.

The Use of Silver-Gutta-Percha Silk in Place of Silver Wire for Buried Sutures (*Silberkautschukseide an Stelle des Silberdrahtes zur versenkten Naht*). O. WITZEL, Bonn. *Zentralblatt für Chirurgie*, No. 35, 1906.

Non-absorbable buried sutures should be not only aseptic, but also antiseptic, even if only very mildly, in order to prevent their proving a nidus for bacterial growth. The suture material should be firm and should not absorb moisture, as, for instance, silkworm-gut, or, even better, silver wire. Witzel has been a consistent advocate of silver wire used to close hernial openings, but though the results are good, he is well aware that the burying of a stiff, hard foreign body in the tissues is far from ideal. The efforts of his assistant, Wederhake, have been crowned with success and the silver-gutta-percha silk fulfils all requirements—non-absorbable, non-absorbent, antiseptic and pliable.

Subcutaneous Extirpation of Varicose Veins of the Lower Extremity (*Ueber die subkutane Extirpation ektatischer Venen der unteren Extremität*). A. NARATH, Utrecht. *Deutsche Zeitschrift für Chirurgie*, 1906, Heft 1-2, Band 83.

The author calls attention to the advantages of the partly subcutaneous method of removing varicose veins. (Mayo has recently described his technic of removal.) Several small incisions are made along the course of the vein, which is ligated proximally and distally to the point of removal and the vein is pulled or twisted out of its bed. Large tributaries require a small incision to permit of their ligation; small branches may be safely avulsed. By this method large, unsightly scars are avoided and much time is saved. The small skin wounds are closed with a few sutures of fine silk, left for 8 days. Fourteen days after operation the patient is allowed to get up, but must wear a compression bandage for some time. This operation was known to the ancients. It was fully described by Oribasius in 325 A. D. It is applicable in all cases in which the varices are not too numerous, are uninflamed and not embedded in exudate or old fibrous tissue.

The Therapeutic Value of Artificial Localized Hyperemia in the Treatment of Ambulatory or Dispensary Cases. EDWIN BEER, New York. *Medical Record*, August 25, 1906.

Beer gives an excellent résumé of the entire subject and reports his personal experiences in 50 dispensary cases. The methods and application are discussed along recognized lines. Of most interest are the results of his personal observations. The author contributes another field for this much discussed agency, in its use as a prophylactic against infection, e. g., infected wounds, especially those acquired by surgeons in the course of their operative work. Beer reports highly satisfactory results in many cases of infected wounds, cellulitis of the finger or of the hand, abscesses, furuncles, carbuncles, suppurative adenitis and acute bursitis. He finds hyperemia in the form of suction eminently useful for "black eyes." The increased flux of blood oxidizes the blood very rapidly and promotes its absorption. In 29 cases of joint stiffness secondary to various inflammatory conditions Beer had very satisfactory results. He finds that while the Martin bandage is on, the patients can make their joints move easily, and the surgeon can employ passive motion more readily and with much less pain. He has also used the Martin bandage in six cases of tuberculous joints with equally satisfactory results. He reports one observation that is of much interest and significance. In an old patient, presenting an advanced tuberculosis of the wrist with numerous sinuses, the venous hyperemia obtained by the Martin bandage caused no improvement whatever; the author noted that after removal of the bandage no reactive hyperemia developed, and ascribed this to the poor circulation of the patient. To test this he applied a bandage to the entire forearm from the finger tips to the elbow and removed it in 15 minutes, whereupon an active hyperemia developed. This was repeated for many months and during this time a marked improvement was noted. On relapsing to the former method of treatment the old condition returned and it as quickly subsided when the second method was resumed. Beer completes his paper by a review of Bier's work and the theoretical considerations of the subject. The author expresses himself with more than the usual enthusiasm.

The Relative Value of the Surgical Procedures Employed for the Relief of Paralyses Following Acute Anterior Poliomyelitis. NATHANIEL ALLISON, St. Louis. *Interstate Medical Journal*, September, 1906.

Allison arrives at the following conclusions: (1) In extreme forms of infantile paralysis, the wearing of apparatus and the use of crutches is necessary, that the upright position may be maintained. (2) In extreme forms of infantile paralysis, the wearing of heavy appliances may be materially lessened by the employment of operations designed to fix the joints. (3) In cases where there is good muscular power remaining in strong muscles, these muscles may be used to good advantage by transference of their tendons. Care should be taken that the insertion of these tendons is strong and permanent, and that the muscles pull to the best mechanical advantage. (4) In certain cases, tendon-transplantation may be supplemented by arthrodeses to good advantage. (5) In slight forms of paralyses, the grafting of nerves is a surgical procedure of recognized merit.

Surgical Affections of the Patella. GUSTAV SCHWYZER, Minneapolis. *St. Paul Medical Journal*, August, 1906.

After a brief discussion along recognized lines of tuberculosis and fractures of the patella, Schwyzer discusses dislocations of the patella somewhat in detail. They are rather rare, comprising less than 1 per cent. of all dislocations. Anatomically, dislocations of the patella are differentiated as to whether they occur to the side (outer or inner), or

whether there is torsion around the vertical axis. A third very rare form is the downward dislocation, whereby the lower border becomes wedged in between the tibia and femur. Upward dislocation is found only in incomplete tears of the ligamentum patellæ.

The outward form is the most common of the dislocations, as well as the most frequent form of so-called "habitual dislocation." The majority of the latter cases have some pathological condition in the knee-joint as the causal factor; sometimes they are congenital. Among these pathological changes may be mentioned, deformity of the outer condyle so that it is less prominent than normally, relaxation of the capsule, abnormal length of the ligamentum patellæ, abnormal smallness of the patella and pronounced genu valgum, shallowness of the intercondylar notch, or abnormal prominence of the inner condyle. In only 20 per cent. of the cases is the dislocation traumatic. The treatment is either operation or brace. The author gives a long list of operations that have been advised for this condidtion. There are as many as there have been operators. The author thinks that each case should be operated according to the anatomical conditions found. Two cases, with excellent result, are reported.

Resection of Both Superior Maxillae (*Die Beiderseitige Oberkieferresection*). P. HILDEBRAND, Berlin. *Berliner Klinische Wochenschrift,* August 6, 1906.

Hildebrand reports two cases with recovery, one for carcinoma, the second for sarcoma. He used the so-called Weber incision, extending from the outer cauthus, below the eye to the inner, then around the nose to the center of the lip. The only feature of the technic that is novel is the reconstruction of the roof of the mouth. If the mucous membrane is already involved, the soft palate and a narrow margin of mucous membrane along the alveolar border are left behind and are then sutured together. If not involved, the entire mucous membrane is left behind. These procedures enable the patient to eat and talk with some comfort.

The Bactericidal Action of Compounds of Silver. C. R. MARSHALL and E. F. M. NEAVE. (Report to the Therapeutic Committee, British Medical Association.) *British Medical Journal,* August 18, 1906.

The compounds tested were collargal, silver fluorid, silver nitrate, itrol, actol, argentol, icthargon, argyrol, albargin, nargol, largin, novargon, protargol, argentamin and argonin. The experiments showed that as regards bactericidal action the various silver salts fall into three groups: 1. Those which are powerfully bactericidal. In this group belong silver nitrate, silver fluorid, actol, itrol, argentamin, argentol, albargin, argonin, icthargon, largin, novargon and protargol. 2. In the second group, which is less powerfully bactericidal, only one compound belongs, nargol. 3. The third group includes those compounds which have no bactericidal power whatever; two compounds belong to this group, argyrol and callargol. As the latter are not at all bactericidal it is evident that their beneficent action depends on some other power.

Urethrotomy for Ruptured Urethra. REGINALD HARRISON, London. *Interstate Medical Journal,* September, 1906.

Ruptured urethra may occur with or without fracture of the pubic arch. If the rupture was not attended with fracture, the old method of treatment depended upon whether a catheter could be passed or not. In the former group of cases, a permanent catheter was usually left in situ; in the latter cases only was a perineal incision thought of. The dangers of ruptured urethra with extravasation of blood and urine, are sepsis and the formation of stricture. Harrison advises, therefore, that in all cases of urethral rupture, perineal urethrotomy should be performed. This will obviate sepsis and ensure a urethra in which no stricture will form. In fractures of the pubic arch the surgeon should always take particular pains to note whether the urethra is injured or not; this is particularly advisable in insensible persons. Urethrotomy in this class of cases is just as much called for as in the former variety.

Subacute and Chronic Seminal Vesiculitis (Catarrhal Form). JAMES W. WILTSE, Albany. *Albany Medical Journal,* September, 1906.

Wiltse reports his experiences as the result of the observation of eight cases. The three important etiological factors in the order of frequency, are: 1. Abuse of the function of ejaculation. 2. Alcohol and tobacco. 3. Bicycle and horse-back riding. The large majority of the patients is usually classed among the neurasthenics. Of the eight cases, one had complete impotence, two partial impotence; there was decreased sexual power in all. In no case was there a history of gonorrhea or syphilis. As regards symptomatology, pain or discomfort is present in almost all cases. The pain may be at the neck of the bladder, or at referred points, such as the tip of the penis, the groin, testicle, etc. In the sexual sphere, there is, in the early stages, increased frequency of erection or erotism. Pollutions occur and there is unsatisfied coitus. The pollutions are always associated with abnormal microscopical elements. Spermatozoa are almost always found in the urine. As the disease advances partial or incomplete impotency supervenes. Urination may be frequent or may be accompanied by a burning sensation in the deep urethra. On the other hand, inhibition may result.

The diagnosis may be made from the history and the results of rectal examination. The latter usually reveals a large and tender seminal vesicle, massage of which generally results in a discharge of milky or glairy fluid from the urthra. Treatment consists in so-called "stripping of the seminal vesicle." This is done by massaging the organ through the rectum with the bladder in a state of distension. The contents are slowly and gradually forced out by the index finger into the urethra. The motion is repeated several times. This is done at intervals of three to five days. No treatment applied through the urethra is of any value.

The Diagnosis of Tuberculosis of the Kidney (*Zur Diagnose der Nierentuberculose*). R. HOTTINGER, Zürich. *Centralblatt für Harn und Sexualorgane,* Heft 8, 1906.

As the attention of surgeons has become focused upon tuberculosis of the kidney the number of recognized cases has marvelously increased, as it was with appendicitis when that disease was first studied. The author bases this article upon 44 cases seen before 1901, and 79 cases observed since then, not counting more than 30 cases observed for only a short period. Ten cases proved bilateral.

Tuberculosis of the kidney may begin with one or more of many symptoms. A clear polyuria and slight albuminuria are not infrequent, but are usually only correctly judged by the future course of the trouble, or when strengthened by a clear history of hereditary taint or tuberculosis elsewhere in the body. Rarely an acute onset with dangerous hematuria or severe continuous or colicky pain has been noted. Far commoner is a slow, insidious beginning marked by urinary disturbances, such as changes in the urine (cloudiness, hemorrhage), pain and kidney tumor. Tuberculosis implanted on a gonorrhea is very rare, as the infection is almost always through the blood and not ascending. The bladder symptoms are irritative in origin—frequent micturition, burning sensations at the beginning or end of the act (even when the cystoscopic picture is negative). Of course, the finding of tubercle bacilli is of prime importance. Of 52 cases bacilli were found at the first examination in 42. Animal inoculation should be used in doubtful cases. The urine may be clear and acid; the albumen usually is scant (less than 2%), but in some instances the unaffected kidney furnishes a higher percentage of albumen (through irritation by the toxins). Hematuria may be said to be present at some time in every case; it has been known to precede active symptoms

by 10 years, and may be very slight (*i. e.*, only microscopical). Rarely blood coagula in the ureter produce colic. The quantity of urine is usually normal or even increased to 2-3 liters. The most constant symptom is pyuria, the quantity of pus depending more upon the facility for drainage of the focus toward the excretory tract of the kidney than upon the extent of the disease. Kidney symptoms proper are often late in appearance. The kidney may not be enlarged to palpation, partly because there may be no great enlargement, partly because the portion most frequently diseased is the upper pole. Thus the kidney is early fixed to the diaphragm, etc., and is prevented from being pushed down. (In 71% of Israel's cases the kidney was fixed.) A diseased ureter may often be felt as a tender thick strand per vaginam, more rarely per rectum. Severe renal pain is the exception and very often the healthy kidney is spontaneously painful or tender to pressure (compensatory hypertrophy and increased intracapsular tension).

The general condition is no guide, fever has no pathognomonic value, and chills are the exception. Differentially, renal stones, neoplasm, non-tuberculous inflammations and enlargement and disease of neighboring organs must be taken into account.

Cystoscopically, cloudiness of the ureteral stream may be noted, but is of no great value. The cystoscopic picture is no absolute guide, and the extent of the kidney changes are rarely proportionate to the bladder disease. The changes at the ureteral opening are of the greatest importance, in over one-half of the cases furnishing a sure guide as to the side affected. In all instances of ureteral change the disease was descending in character. Swelling, redness, gaping of the orifice, distortion, crater-like excavation, are seen. In non-tuberculous cystitis the swelling is more diffuse, the changes are coarser. To find visible tubercles is not exactly common. When present they appear as clear, transparent granules shining through the mucous membrane, most common at the dividing point of vessels. Ulcers, superficial in character, of dirty brown to red color, with edges well defined and covered with a fine flaky discharge, are found in the vicinity. Of less common occurrence are granulations about the ureter and in their neighborhood. These granulations (glassy, tense) are of short duration, and may resemble papillomatous formations. The functional diagnostic methods practiced in connection with cystoscopy are purposely not considered. The author concludes with a description of a modified and simplified cystoscope of his own design.

A Contribution to the Plastic Surgery of the Renal Pelvis. J. W. T. WALKER, London. *Lancet*, August 11, 1906.

The case was that of a woman who presented a large tumor in the left groin, and had given a fairly definite history of movable kidney with Dietl's crisis. At the operation the kidney was found to be attached to an immensely dilated renal pelvis, on the surface of which the ureter was seen to be adherent and kinked. The author released the ureter and excised a large triangular area from the posterior wall of the pelvis, the base of the angle being parallel to the hilus of the kidney. The apex of the triangle was situated a short distance below the mouth of the ureter. The opening thus made was sewn together, thus diminishing appreciably the capacity of the pelvis. In order to ensure the intactness of the suture line a tongue of the kidney capsule was turned over and sutured over it to the surface of the pelvis. A nephropexy was then performed and the wound closed. The patient was entirely well 8 months later.

Congenital Cystic Kidney. F. B. LUND, Boston. *Journal of the American Medical Association*, August 18, 1906.

Lund has studied the subject more from the surgical than the pathological aspects and arrives at the following conclusions:

(1) If there be sufficient healthy tissue between the cysts to perform the normal renal functions the disease may never attract attention, and the patient may live a normal life and die of disease independent of the kidneys.

(2) Under the same conditions as to renal tissue, while the renal excretion is normal, the cysts may cause pain and discomfort from their size and weight without dangerous symptoms for years. Mobility of the kidney, with its accompanying troubles, may result from this enlargement.

(3) The growth and enlargement of the cysts may so strangulate and compress the normal kidney tissue between them as to throw it out of commission, so that stasis and uremia may result.

(4) The normal tissue between the cysts may become affected by the various forms of nephritis, just as healthy kidney may, and this nephritis may be fatal in itself or by reason of the cardiac and arterial changes which accompany it.

(5) These same cardiac and renal changes may and do accompany the compression of the intervening tissue by the cysts, and are not an infrequent cause of death in these cases.

(6) The surgical aspects of the disease relate to the pain and discomfort due to the size of the tumors or mobility resulting from them, and in operating for these conditions it is all important to remember the pathology of the disease and more especially the fact that it is bilateral in 98 per cent. of the cases. A cystic kidney, while causing pain and disability by its enlargement, may still be performing so large a part in urinary excretion that its removal would be dangerous to life from renal insufficiency.

(7) It, therefore, becomes important if possible to take some means to diminish the size of the offending organ and anchor it in place without interfering with its secreting functions. Such a procedure, which will be vastly safer than nephrectomy, consists of the free incision and puncture of the larger cysts, thus diminishing notably the size of the kidney, and suturing the organ in position. If for any reason a nephrectomy seems desirable it should not be performed unless an exploratory incision or uretral catheterization has demonstrated that the other kidney is healthy.

The Truth About So-called Maternal Impressions. A. DIXON, Henderson, Ky. *Surgery, Gynecology and Obstetrics*, September, 1906.

Some authorities claim that maternal impressions can produce malformations in the fetus. Popular belief goes even further and is inclined to ascribe all abnormalities to this cause. No nervous connection between mother and child has ever been found and therefore such authors as Hammond and others are forced to consider the impression as transmitted through the blood, although maternal and fetal blood are also separate. Tuke, for instance, says that the imagination of the mother, united more or less with emotion, produces corresponding effects upon tne unborn child.

Dixon, by means of a comprehensive review of the normal developmental stages, shows that *arrests of development* alone can produce the various monstrosities, abnormalities, birthmarks, etc., used to illustrate the theory of maternal impressions. Among the various causes are injuries, amniotic bands, pressure by the umbilical cord, adhesions of the placenta, some pathological condition of the fetus or its membranes, and heredity. Some of the worst monstrosities are permanent embryos. The author traces the ovum through its one-cell stage, through the stages corresponding to various invertebrate and vertebrate types, until it reaches the human form (Haeckel). At any time complete or partial arrest may occur. Common causes for deformity are intrauterine fetal peritonitis, inflammations of the middle ear (deaf-mutism), excessive vascular anastomoses (birthmarks), excessive evolution in extremities (supernumerary fingers and toes), etc. On the other hand, morbid adhesions or bands may produce amputations; if these occur early nature attempts to regenerate the defect and we find fingers or toes on the stump. Double monsters are due to two-germ areas developing in close proximity in the same ovum. Definite laws govern their sex, the relation of organs, etc. Hunter,

Fischer and others questioned large series of women about impressions, before their babies were born. Although many claimed to have had impressions the children proved healthy. Nothing, as far as real evidence is concerned, sustains the view that maternal impressions can influence the fetus.

The Fetich of the Ovary. E. VAN DE WARKER, Syracuse. *American Journal of Obstetrics,* September, 1906.

The author objects to the almost universal explanation of pelvic pain by ascribing the cause to inflammation of the ovaries. He concludes that much too much importance is given to ovarian inflammation. The ovaries possess a wide physical and psychical influence, but nevertheless their reflex (pain producing) power is exaggerated. Inflammation of the ovarian stroma is very rare, attended by but little pain and quickly recovered from. Any pain in the lower abdomen is generally explained by both general practitioner and even the gynecologist as due to inflammation of the ovaries. Women have been induced to attach too much importance to the ovaries by having ovarian disease constantly pictured to them. The position of the ovaries in the pelvis is a minor matter, unattended by functional or sensory disturbances, these being due to other pelvic conditions. Palpation of the ovaries when in the normal position is difficult and is accomplished with certainty only in thin, lax subjects.

The Use of the Pessary. H. A. SLOCUM. *N. Y. Medical Journal,* September 1, 1906.

The value of the pessary in gynecology is becoming more and more recognized. Simple as the principle on which it is based, its proper application is a rather difficult art; unappreciably so. Slocum divides the indications for its use in the following manner: 1. In all cases of uncomplicated retroversion when the uterus can be brought forward, especially in young women and in cases of recent origin, as after a fall and undue muscular exertion. 2. As a temporary appliance before or after operation. This field includes mostly cases of retroversion complicated by endometritis with large, boggy uterus, and cases of subinvoluted retroverted uterus. 3. After childbirth in cases predisposed to retroversion. It is also of value in some cases of sterility. As contraindications Slocum mentions laceration or relaxation, where the power of retaining the pessary is lost, lacerations of the cervix, senile vaginitis, conical vagina, etc. The author does not believe that all retroversions are pathological and in cases where no symptoms are produced he does not introduce any pessary whatever.

The Operative Treatment of Inguinal Hernia in Children (*Ueber die operative Behandlung von Inguinalhernien bei Kindern*). BÜHLMANN, Bern. *Deutsche Zeitschrift für Chirurgie,* Vol. 83, Heft 3-4, 1906.

The author gives a short historic review of herniotomy as an operation. He declares that trusses fail in most instances to cure herniæ in children, and that, as children bear the radical operation well and as recurrences are rare, there is no reason why radical cure should not be undertaken. Coley in 15,000 herniæ found nearly one-third in children. The frequency of the occurrence is due chiefly to the late descent of the testicle into the scrotum. In the infant the inguinal canal is almost straight, consequently direct hernia is practically unknown. The varieties of oblique hernia are testicular, funicular, interstitial and projection of the parietal peritoneum merely through the internal ring. The best operative procedure is simple. No complicated operation such as that of Bassini, McEwen, etc., is needed. Prof. Tavel, whose cases the author reports, merely cuts down upon the sac without incising the external ring, frees the sac from the cord, and after ligating the neck of the sac allows it to recede through the canal. The canal is closed by means of three silk sutures which close the external ring and at the same time draw the external oblique fibers down to Poupart's ligament. Just enough space is left to avoid strangulating the cord. After suturing the skin a simple collodion dressing is applied. A single operation takes ten to fifteen minutes, a double operation twenty to thirty minutes. The weakest child can stand this interference. The child is tied in bed and the penis placed in the neck of a glass bottle so that the urine drains away. In all, 198 operations are reported, with two recurrences and one death (eight days post-operatively). Five infections occurred, none of which was followed by recurrence. Eight herniæ were strangulated. Technically, the younger the child the simpler is the operation. The results justify the procedure.

Notes on a Case of Fissura Abdominalis; Operation at Age of 2 1-2 Hours. H. STEVENSON, Ulster. *British Medical Journal,* August 4, 1906.

The child was a seven to eight months premature infant and presented at birth a fissure 1 to 2 inches in length through which a large mass of intestines and a patent Meckel's diverticulum were protruding. The diverticulum was removed, the intestines replaced and the abdomen closed by layer suture; primary union. Unfortunately jaundice supervened with purpuric spots on the extremities, and the child died on the ninth day.

Typhoid Infections of the Appendix. M. H. AUSTIN, Anderson, Ind. *N. Y. Medical Journal,* September 1, 1906.

Austin reports two cases. In the first, the case began as an appendicitis; under treatment with ice bags the patient did not improve and a gangrenous appendix was removed on the 7th day. The subsequent course was typically typhoidal, with recovery. In the second case the attack of appendicitis occurred in the third week. It recovered under palliative measures.

Cancer of the Colon, with Special Reference to Its Diagnosis. Types of Operation. Method of Avoiding Fecal Drowning. WILLY MEYER, New York. *Surgery, Gynecology and Obstetrics,* August, 1906.

Meyer limits his discussion to cancer lying between the cecum and sigmoid. The most frequent sites are the sigmoid, the two flexures, and descending colon, then the transverse, and finally the ascending colon in the order given. The disease is rarely found before the fourth decade. The infiltrating, medullary, the glandular and the constricting scirrhus carcinoma are all encountered. Of subjective symptoms, most constant are obstinate constipation with occasional attacks of diarrhea, colicky pain, and nausea and vomiting. Periodic contraction of the abdomen (*subjective* intestinal stiffening) is a valuable symptom. An increased tendency to expel gas and inability to retain it, is also met with. Objectively, a tumor is found in 40% of cases (Treves); inflation of the large bowel with gas may be of aid. Chronic circumscribed meteorism, if present, is of great assistance in localizing the tumor. Nothnagel's "darmsteifung," *i. e.,* localized, frequent and persistent stiffening and erection of the gut is a pathognomonic symptom. Feces with persistent foul odor, pus, fragments of tumor, etc., should be looked for, other intestinal conditions, however, requiring to be excluded. A little known symptom described by S. Pollitzer, multiple capillary angiomata and pigmented warts (manifestation of acanthosis nigricans) is found in some cases of abdominal cancer. Meyer noted it in four cases, in one of which the pigmentary warts disappeared after operation. Continuous loss of weight and increasing anemia are confirmatory symptoms. Differentially, tumor of the kidney, floating kidney, chronic cholecystitis or hydrops of the gall-bladder, and benign intracolonic, sessile tumors must be taken into account.

Of the radical operations the one-stage operation is indicated in early cases only. It may take the form of resection and end-to-end anastomosis, or of lateral anastomosis, at some distance, and resection. Meyer has always been obliged to do the two-stage operation. The operation of choice is an ileo-colostomy (button or elastic ligature),

at a later date resection of the growth and closure of the two ends of the gut (pursestring after inversion). Another method is temporary partial eventration of the gut, including the tumor, after ligation of the necessary part of the mesocolon, removal of the eventrated tumor in 36-72 hours with the thermocautery, closure of the artificial anus at a later date with clamp (Mikulicz). In weak patients, with marked distension, etc., a preliminary enterostomy, later lateral anastomosis with or without immediate resection, and finally closure of enterostomy wound, represent the required procedure. Palliative operations may be limited to lateral anastomosis at some distance, to establishment of an artificial anus (cecal), and to enterostomy where obstructive symptoms predominate. Where intraoperative fecal vomiting is feared Kausch's esophageal narcosis tube may be used. It consists of a stomach tube which passes through a rubber balloon. After introduction into the stomach the balloon is inflated and, by means of the tube, pulled firmly against the cardia, consequently all vomited matter must pass through the stomach tube. Meyer reports eleven cases of cancer operated upon, in five of which an artificial anus alone was established.

Gastro-Mesenteric Ileus. J. M. T. FINNEY, Baltimore. *Boston Medical and Surgical Journal,* August 2, 1906.

In this paper Finney calls attention to a certain group of cases which present symptoms of acute dilatation of the stomach, and in which at autopsy, in addition to the dilatation, there is found obstruction of the transverse duodenum by the edge of the mesentery, while the small intestines are collapsed and fill the pelvis. He believes that many cases that have been regarded and described as acute dilatation of the stomach are really cases of gastro-mesenteric ileus. The condition is more common than is supposed, and is usually overlooked at autopsy because it is not suspected. Whether the acute gastric dilatation or the obstruction of the duodenum is the primary condition has not as yet been determined; at all events, we must recognize that in these two conditions we have factors that may produce a so-called vicious circle.

As regards etiology, Finney mentions indiscretions in diet, enteroptosis, debility, whether caused by wasting diseases or by acute infections, surgical operations or narcosis. To these might be added certain grave toxemias, and severe injuries. The author thinks that of surgical causes narcosis comes first, especially chloroform. The symptoms of this condition are, vomiting at frequent intervals of large quantities of fluid, greenish or yellowish at first, later black; abdominal pain, observed at the outset; distention of the abdomen, beginning above and gradually extending below, usually present; tenderness, rapid pulse, normal or subnormal temperature and constipation. The amount of urine is much reduced. The diagnosis would appear easy, but is not made, as a rule. The large majority of the cases has been mistaken for intestinal obstruction and peritonitis, particularly the latter. The most important differential elements are, the characteristic clinical picture described above, the use of the stomach tube and the presence of succussion. Treatment consists mainly in the frequent use of the stomach tube and the avoidance of dorsal decubitus. In refractory cases the knee-chest position should be resorted to. Strychnin and atropin in large doses have been recommended. Gastro-enterostomy is usually of no avail. When the ordinary measures have been unsuccessful, manual replacement of the misplaced viscera through an abdominal incision should be carried out. The prognosis is grave, most cases ending fatally.

Acute Dilatation of the Stomach and So-called Arterio-mesenteric Intestinal Obstruction (*Ueber akute Magenerweiterung und sogenannten arterio-mesenterialen Darmverschluss*). NECK, Chemnitz. *Muenchener Medizinische Wochenschrift,* No. 32, 1906.

The author reports four cases of acute dilatation of the stomach, all of which were accompanied by absolute intestinal obstruction. The onset was sudden. There were preliminary abdominal pain, absolute constipation, greatly diminished secretion of urine, great prostration, rapid and impeded respiration and more or less vomiting. The abdomen appeared distended on the left side, dulness extending from the hypochondrium down to the pelvis and in two cases reaching across the median line. The general picture was that of a partly sacculated peritoneal exudate with acute intestinal obstruction. Over the flat area succussion and a fluid wave could be elicited. In two of the cases kyphoscoliosis had existed since childhood, and this seems a predisposing factor; two of the cases gave the history of gross errors in diet, another common etiological factor. The autopsy on the fatal case showed the proximal half of the duodenum much overdistended, while the distal portion, separated from the former by the tense strand formed by the superior mesenteric artery, was empty and collapsed as was the entire small intestine. The stomach proved to be enormously dilated, flabby and deeply congested, the pylorus fully patent.

The three surviving cases recovered promptly after repeated emptying of the stomach, with the patient in Trendelenburg's position, by means of the stomach tube. Of the 67 cases reported in the literature, 47 died, all of those on which a laparotomy was performed ending fatally. Until the stomach is again normal rectal and subcutaneous feeding and judicious stimulation are indicated.

Gastric Ulcer and Cancer. CHRISTOPHER GRAHAM, Rochester, Minn. *Boston Medical and Surgical Journal,* August 23, 1906.

Of 81 cases of gastric cancer occurring in the St. Mary's Hospital, in Rochester, Minn., 39 were submitted to pathological examination. Of these 54% gave definite pathological evidence that the cancer had developed from an old ulcer. In 25% the evidence was fair, while in only 8 cases was there no evidence of preceding ulcer irritation. Twenty-one of the 39 cases gave long histories, of which 14 gave good pathological evidence; 6 in which the history was long, gave evidence considered only fair; 7 cases whose histories varied from two months to two years, gave good pathological evidence, and 4, the histories of which covered from one and one-half months to two years, offered fair proof. Thus the anamnesis and the pathological findings ran together, both being positive in over half the cases. The above figures emphasize two points: 1. That short histories and ulcer as the old lesion on which cancer is engrafted, are not incompatible, as some argue. 2. That ulcer is a fertile soil for cancer.

Graham goes into the clinical history of gastric cancer, based on ulcer, somewhat in detail and divides the course into four periods. The first is the premonitary stage of gastric ulcer, the second is the stage of the well developed ulcer, the third is the transition period, and the fourth is the stage of the well developed cancer. The author adds some additional statistics which may be of interest. Males and females were affected in the ratio of four to one. In three-fourths of the cases the symptoms were present only for a year or less. Of the 81 cases all but 8 complained of pain. Vomiting was a symptom in 68 cases. Tumor was present 27 times, doubtful in three. Dilatation was present 54 and obstruction 36 times. Free hydrochloric acid was found in 32 cases, combined hydrochloric acid in 32; lactic acid in 42; fatty acids in 19; both hydrochloric and lactic acids in 13.

Some Observations on the Significance of the So-Called Occult Hemorrhages in the Diagnosis of Ulcer and Carcinoma of the Stomach. JULIUS FRIEDENWALD, Baltimore, and L. J. ROSENTHAL, Baltimore. *N. Y. Medical Journal,* August 11, 1906.

The authors regard the test for occult blood in the feces as one of the most important diagnostic aids in our possession. The Weber test or the Klunger aloin test may be used. This test was positive in 74 per cent. of ulcers of the stomach, and in 82.6 per cent. of gastric cancers. It is important before applying the test to withdraw all meats, sausage, etc., for three days. The technical details of the tests are described.

Liver Abscess: Six Cases: with Special Reference to the Etiological Importance of Ascaris Lumbricoides. J. F. LEYS, U. S. Navy. *Journal of the Association of Military Surgeons,* September, 1906.

Leys reports six cases of liver abscess: in three the etiology was dysentery; in one distomata were found in the abscess; the other two were associated with ascaris in the intestinal tract. Leys believes that the ascaris is probably not a mere unusual and extraordinary cause of liver abscess, but is an important and frequent cause, probably after dysentery the most frequent one. Cases of liver abscess associated with iscaris have been reported fairly frequently before, but always as a rare and accidental finding.

Solitary Abscess of the Liver. *A Contribution to the Pathology, Diagnosis, and Treatment of This Disease, Based on the Study of Eighteen Cases.* C. A. ELSBERG, New York. *Annals of Surgery,* August, 1906.

The tropical abscess follows amebic dysentery (rarely Shiga bacillus dysentery; it may be multiple). The traumatic abscess follows infection of a hemorrhage in the liver, or direct infection of the liver surface. The pyemic abscess is part of a systemic pyemia. There are liver abscesses secondary to a variety of abdominal affections, sometimes of obscure origin, and probably carried to the liver by the portal vein. Of the 18 cases operated upon, 12 showed a distinct traceable etiological factor—1 trauma (gunshot), 1 cholelithiasis, 1 chronic colitis, 1 acute appendicitis, 1 osteomyelitis of tibia, 2 hemorrhoids, 2 intermittent fevers, 3 occasional diarrheas. The 6 others had had no previous illness. Solitary abscess after acute appendicitis is so rare that this case is detailed (14 cases in the literature). The bacteria may reach the liver by direct extension (bile ducts, abscesses nearby, e. g., subphrenic), by the lymphatics, through the systemic arteries or by the portal system. Thus lesions of the gastro-intestinal tract, giving no symptoms, may be the cause.

In 16 of the 18 cases the abscess was in the right lobe, and with one exception in the upper part of this lobe. The size of the abscess, the character of the pus and the nature of the bacteria vary greatly. In ten cases six abscesses were sterile. In 30% of the cases the abscess had burst into the subphrenic space. The onset may be acute with constitutional symptoms and pain in the chest, or pain in the epigastrium. Other cases show a more subacute or a chronic course with loss of flesh and strength and irregular fever. There may be signs of fluid in the chest, enlargement and tenderness of the liver, etc. A latent period of months or years is not uncommon. Jaundice appeared in only 2 cases; in all there was leucocytosis. In diagnosis it may be difficult or impossible to differentiate liver abscess from subphrenic abscess or empyema; it is almost impossible to exclude the possibility of the abscess being multiple. Here the etiological factor is of importance. Suppurating echinococcus cyst or suppurating hepatic gumma has been mistaken for liver abscess. The aspirating needle is the only sure means of determining the presence of pus. Of the 18 patients, 5 died (28%). In 182 collected cases, 24% died.

When liver abscess is suspected the aspirating needle should be used. The abdominal route should be limited to cases pointing to the lower surface of the liver, the left lobe or where abdominal symptoms are prominent; other cases should be drained by the infrapleural or transpleural method. If the costophrenic sinus is not obliterated by adhesions suture of diaphragm to pleura will prevent an acute pneumothorax. After the diaphragm is incised, if the peritoneal cavity is not shut off by adhesions, gauze packings must be used to accomplish this exclusion and should be left in situ for 6-10 days. A grooved director is pushed alongside the aspirating needle into the liver substance and then a dressing forceps is introduced, by means of which the opening is dilated. If the abscess has burst into the subphrenic space, this space must also be drained. Deep-seated abscesses may be reached with the actual cautery to overcome hemorrhage, but this precaution is rarely necessary.

A Review of Fifteen Hundred Operations Upon the Gall-Bladder and Bile Passages, with Especial Reference to the Mortality. W. J. MAYO, Rochester, Minnesota. *Annals of Surgery,* August, 1906.

From 1901 to 1906 the Mayo brothers operated upon 1,500 cases with 66 deaths (4.43%). In the first series of 1,000 cases the mortality was 5%; in the second, of 500 cases, it was 3.2%. 845 cholecystostomies were performed with a death rate of 2.13% (second series, 1.47%). Cholecystostomy is the operation of choice if the disease is limited to the gall-bladder. The gall-bladder should be removed where stones or kinks exist in the cystic duct and the bladder contains no bile, also where the walls of the gall-bladder are much thickened (possible cancer). When common duct interference may be needed it is well to leave a functionating bladder, for it acts as a guide and a drain outlet.

Cholecystectomy was done 319 times with a mortality of 3.13% (1.62%, second series). Where the disease is confined to the bladder and this is readily removable, the removal is indicated, unless obesity or broad attachment make drainage alone preferable, for it is a slightly less dangerous procedure.

Common duct operations were performed 207 times. Four groups may be distinguished. Group I. showed obstruction with no active symptoms and little or no jaundice (105 cases, deaths 2.9%). Here there was little or no infection. Group II. consisted of those with active infection, not only of the common duct, but also of the liver. Ususally stones were present; fever of the Charcot type was always noted. In these cases later formation of hepatic stones and subsequent recurrence of trouble were found seven times (61 cases, mortality 16%). Group III. was of those cases showing complete obstruction of the common duct (29 cases, 34% of deaths). In group one the bile was comparatively healthy, showing a little mucus; in group two the bile was darker and contained much mucus, often also colon bacilli; in group three no or little bile was found in the duct, then of dark spinach color. The worst cases showed complete acholia—only a little colorless, clear mucoid secretion. The general condition was very poor—asthenia, edemas, albumen and casts. Operation during the acute attack is found very fatal, somewhat less dangerous is operation in the comparative intermission. Relief by ulceration of the stone into the intestine was seen in four instances. The commonest cause of death is exhaustion from cholemia. Group IV. was composed of malignant disease (12 cases, mortality 33 1-3%). Of small carcinomata of the papilla two primarily successful excisions were performed. Inoperable are extensions from the gall-bladder or the pancreas. Here even exploratory laparotomy gives a high mortality.

In 86 of the 1,500 cases the pancreas showed inflammatory changes. Four cases were acute (with two deaths); six were subacute (one death); nine cancer (five deaths), and sixty-seven showed chronic changes. The chronic changes, unless obstructive, have no influence on the biliary conditions.

Of all the 66 deaths, 15% were accidental and could be eliminated. Most of the deaths were due to cessation of liver function (infectious basis), next in number were those due to exhaustion from chronic cholemia. The disease, while still in the gall-bladder, can be removed with a mortality of 1.47% (cholecystotomy) to 1.62% (cholecystectomy). With the passage of the stone into the common duct the dangers increase (infection, cholemia, carcinoma). "One patient in six had allowed the favorable time to go by, although they had ample warning in the early and safe stage for operation."

Cirrhotic Changes in the Liver Following a Single Injury. W. G. MACCALLUM, Baltimore. *Journal of the American Medical Association,* September 29, 1906.

MacCallum notes the fact that the circulation of various poisons in the blood may cause focal or diffuse destruction of the liver cells. If limited in extent there may be no definite symptoms and the injured portion is replaced

by scar tissue, the other portions being hypertrophied to compensate. If the cause persists, these changes may be continuous and finally result in one or other of the forms of cirrhosis of the liver. If the injury is very extensive, symptoms at once arise and a condition commonly classed as yellow atrophy of the liver may be brought about and quickly cause death, with great distortion of the liver. Such a case is referred to. There is a scarred condition of the liver intermediate between the ordinary cirrhosis and the extreme distortion above mentioned, a condition, in other words, in which some single attack of infectious disease or some single intoxication has produced a single non-progressive, though widespread, injury from which complete and permanent recovery has occurred. Generally such livers show a smooth, even surface, interrupted only by a network of fine linear grooves indicating where the destruction of liver cells occurred. Elsewhere the lobules are normal, except for being a little larger than usual. These cases, when observed at autopsy, are commonly recognized as cases of incipient cirrhosis, but MacCallum holds that there is no evidence that the condition is part of a progressive process. It seems more probable that there is here a stationary condition differing from ordinary cirrhosis merely in not being progressive and representing only the scars of an old injury.

The Value of X-Rays in Ocular Therapeutics. G. ORAM RING, Philadelphia. *Journal of the American Medical Association*, September 29, 1906.

The author concludes, from an extensive review of the literature and from his own observations, that x-ray therapy is very promising in malignant diseases of the eye. In superficial epithelioma and rodent ulcer of the eyelids it can usually be relied on to effect a cure. It is believed that good results obtained in certain cases of malignant disease of the cornea, conjunctiva and caruncle will become general under more improved technic, and that the x-ray has proved of much value in the more extensive orbital carcinomata, though the results are less favorable the deeper the growth. Enough cures have been reported of lid and orbit sarcomata to warrant an exhaustive trial of the x-ray in this disease, more radical operative measures, with subsequent x-ray treatment, being indicated in case of primary failure. Ordinarily the rays have an anodyne effect in malignant disease of the eyelids and orbit, but in some cases exacerbations of pain have been reported from their use. X-ray treatment has been of benefit in trachoma, and there is testimony as to its value in vernal and chronic conjunctivitis, scleritis, episcleritis (Pardo), traumatic uveitis (Jackson), conjunctival tuberculosis (Stevenson), corneal ulceration (Dennett), glioma (Hilgartner and Würdemann) and gumma (Parker). Further testimony is needed before positive statements can be made as to its value in painful types of iridocyclitis and glaucoma. Ring cautions against submitting cases to any but experts in x-ray treatment and quotes instances in which unexpected and serious results have followed their use. He has seen some uncomfortable symptoms, which, however, ceased after the discontinuance of the treatment.

History of Our Knowledge of Aspiration Drainage in Empyema, and Other Surgical Conditions. J. D. BRYANT, New York. *Surgery, Gynecology and Obstetrics*, August, 1906.

The author reviews the methods of Potain, Playfair, Bülaw and Perthes. He then describes a simple method, by means of which continuous suction drainage can be maintained, without the necessity of confining the patient to bed. A rubber tube is fastened into the empyema or other thoracic wound, the joint being rendered air-tight by means of cotton, rubber tissue fastened with chloroform or a thick zinc oxid paste. To the distal end of the tube a glass connecting tube, a stopcock and collapsible rubber bag are attached. The bag is compressed and not released until the apparatus has been connected. When released it tends to produce a slight degree of suction which serves to drain the cavity. The apparatus is light, readily retained by means of bandages, and not difficult to keep in order. Bryant has used it with success in cases of pus in the pleural cavity. The length of treatment varied between 4-11 weeks. If a lung perforation exists the vacuum is interfered with, but the treatment can be applied.

Book Reviews.

The Practice of Pediatrics. *In Original Contributions by American and English Authors.* Edited by WALTER LESTER CARR, A.M., M.D., Consulting Physician to the French Hospital, New York, etc. Royal 8vo; 1,014 pages; 199 engravings and 32 plates. (*The Practitioners' Library.*) Philadelphia and New York: LEA BROTHERS & Co., 1906.

This work is a companion to two other text-books, one on Gynecology, edited by J. Wesley Bovée (recently reviewed in these columns), and the other on Obstetrics, not yet issued—the three constituting a "practitioners' library" on these somewhat closely related subjects.

Fourteen authors have contributed to the volume. Two of these are English pediatrists—F. John Poynton, London (section VIII, diseases of the heart and bloodvessels), and Clive Riviere, London (section VII, diseases of the respiratory tract). The other writers are American—Edward P. Davis, Philadelphia (section I, diseases and injuries of the newborn); the late Leroy Milton Yale, New York (section II, development, growth and hygiene); Thomas S. Southworth, New York (section III, infant feeding); David Bovaird, Jr., New York (section IV, diseases of the alimentary tract); George M. Tuttle, St. Louis (section V, rachitis, scorbutus, marasmus); Charles G. Jennings, Detroit (section IX, diseases of the genitourinary system); John Ruhräh, Baltimore (section X, diseases of the blood and lymphatic system); Daniel J. McCarthy, Philadelphia (section XI, diseases of the nervous system); Charles T. Dade, New York (section XII, diseases of the skin); Isaac A. Abt, Chicago, Matthias Nicoll, Jr., New York, and Floyd M. Crandall, New York (collaborators with Bovaird, McCarthy, Ruhräh and Tuttle in the chapters constituting section VI, infectious diseases). The labor of W. Lester Carr appears to have been limited to that of editor, a task of no slight dimensions, however, in a book built by so many hands. To him much of the credit for the general character of the work and, no less, for the excellence of its detail, is obviously due.

This is strictly a text-book, in conception and in execution, and as such it is to be judged. Somewhat voluminous, it is probably intended chiefly for practitioners, but it is by no means unsuitable for students. The work is essentially clinical in character and devotes most attention to symptomatology and treatment. Representative of the accepted teachings in modern pediatric practice, it also reflects much of the personal experiences of the collaborators.

Sixty-eight pages are devoted to the section on infant feeding. This section is therefore by no means a treatise on the subject. Indeed, it avoids the discussion of the mooted physiological problems involved, and it makes no attempt to describe many of the various methods of milk modification. It does, however, present the essentials of the subject in a clear and practical fashion. The other sections are likewise altogether practical. They all show care in preparation and in editing.

Most of the half-tone reproductions of photographs have suffered much in their transfer to the printed page.

Books Received

Walter Reed and Yellow Fever. By HOWARD KELLY, Professor of Gynecology, Johns Hopkins University. Octavo; 290 pages; illustrated. New York: MCCLURE, PHILLIPS & Co., 1906.